ALL AIRCRAFT
TECHNICAL TRAINING MANUAL

EWIS COURSE

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SAFETY PRACTICES

CURRENT IS LETHAL

In this module we will remind you some basic rules to follow and the safety procedure to observe in order to protect yourself and the aircraft.
Electrical current can cause a serious flesh burn, it also stimulate spastic muscle contractions, disrupt the electrical activity of the brain and heart and injure other internal organs.
The reason of this reaction is that the human body reacts as a classic current receptor and has a resistance. Consequently we can consider that the intensity of the current is the first factor of a serious shock.
A second aggravating factor is the time duration the courant goes though the human body.
To conclude, depending on the current (Voltage U and Intensity I), the effects can be extremely dangerous because the receptor had a certain resistance R.
When unfortunately this shock occurs there is some basic rules to apply. Theses rules are generally put on placards in the workshops as shown in this example.
Here are some other examples of placards.

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CURRENT IS LETHAL

CURRENT IS LETHAL

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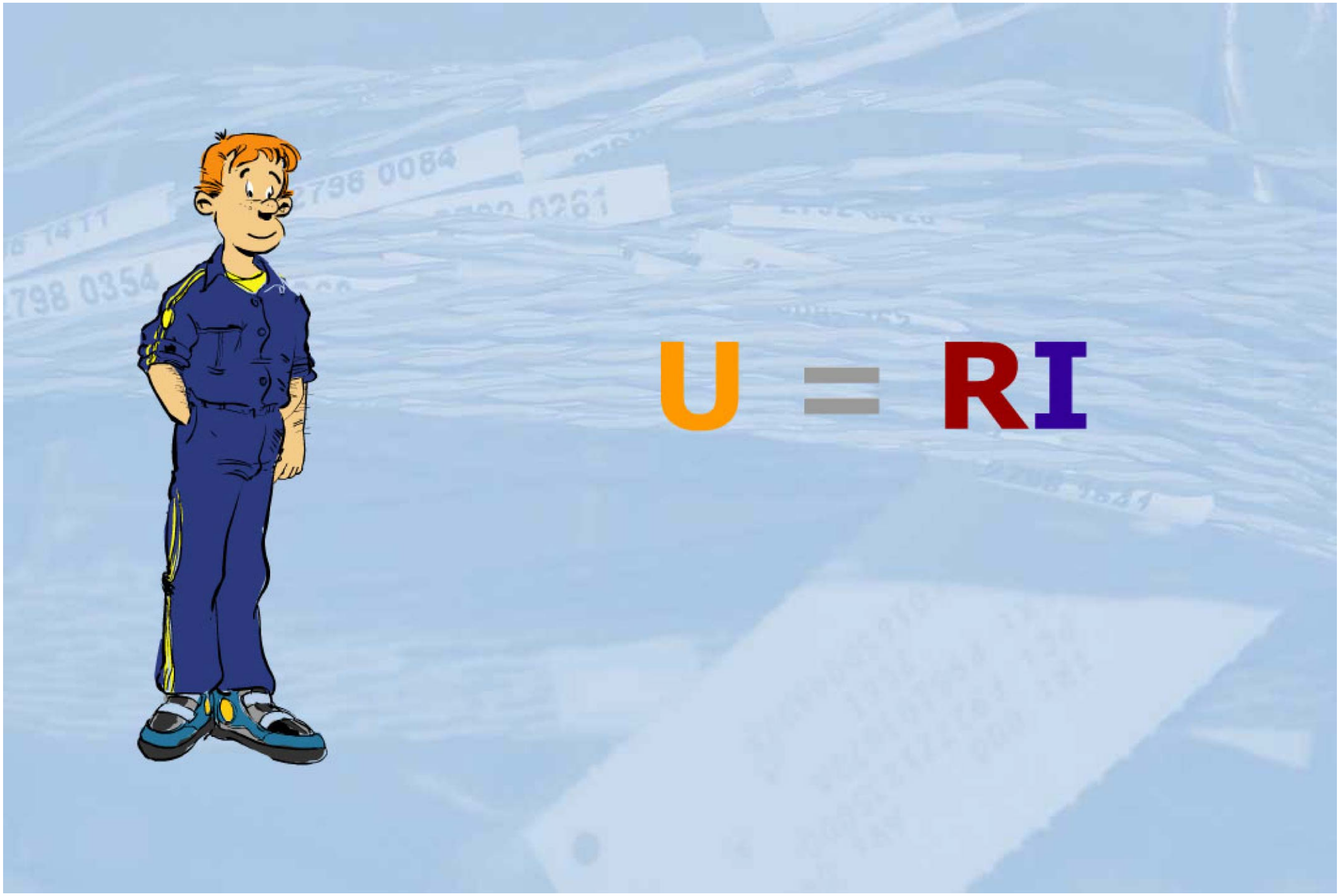
CURRENT IS LETHAL



CURRENT IS LETHAL

CURRENT IS LETHAL

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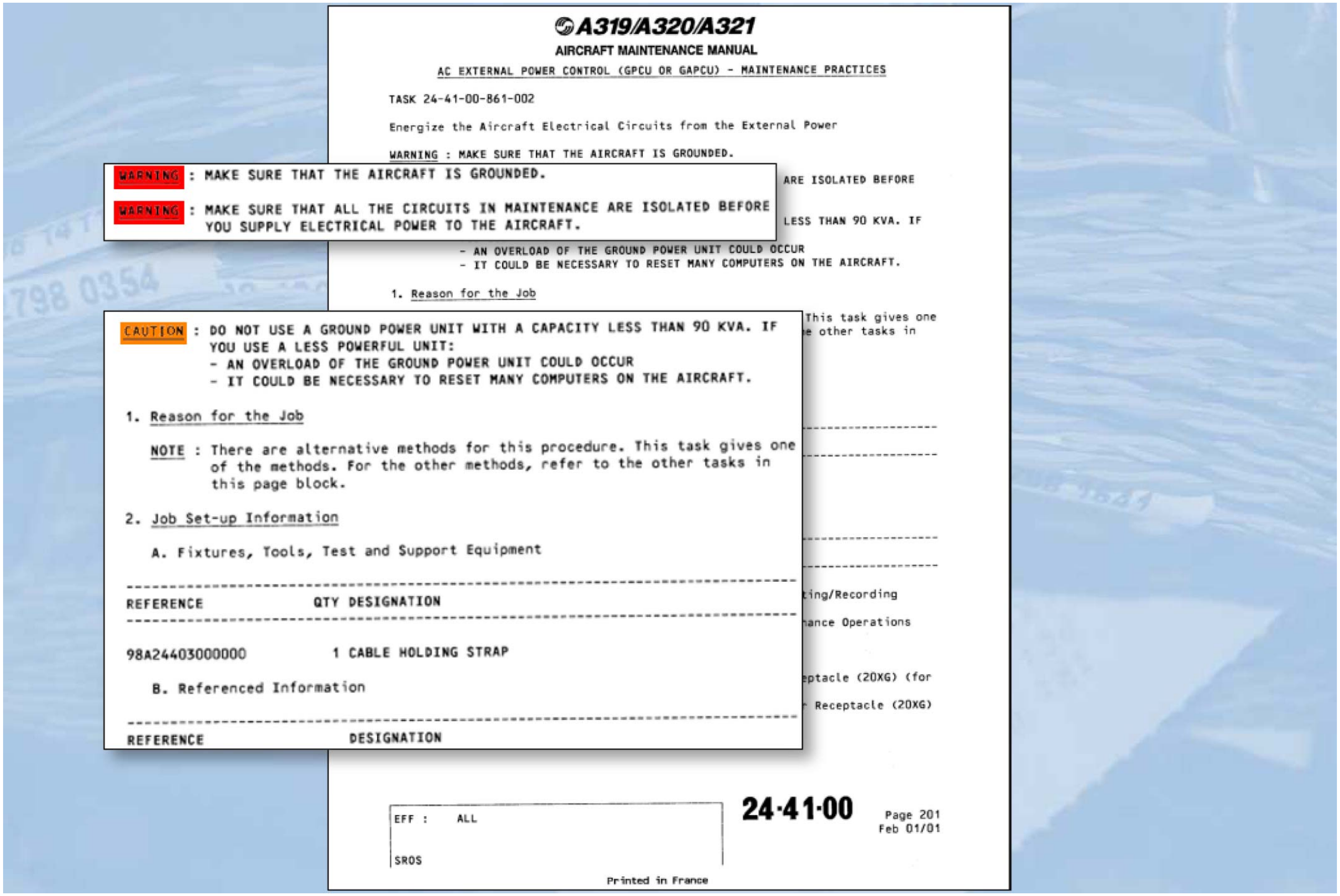
SAFETY PRACTICES

APPLYING POWER TO THE AIRPLANE

Now concerning the aircrafts, there are some procedures related to the electricity.
For example, for applying power to the airplane, there is an Aircraft Maintenance Manual (AMM) procedure.

AIRPLANE WARNING

In this procedure you can see there is warning and cautions.
The warnings indicate that you have to make sure the aircraft is grounded and to make sure that all the circuits in maintenance are isolated before applying power to the aircraft.
The caution indicate you that you must not use a ground power capacity less than 90KVA and explain you what could happen if you do not obey to the caution.
Now to be more accurate with the warning and caution, what is the difference?
The definitions of terms are given in the ESPM as you can see.
To resume, a warning call attention to use of material to avoid injury or death to persons; and a caution is used to call attention to method or procedure to avoid damage to equipment.
Consequently it is very important to carefully read warnings and cautions when you have to apply a procedure.
In other words, it is strongly recommended to use warning notices when asked.
In the safety practices of the ESPM (20-10-00), you can retrieve a typical tag that is dedicated to be printed on a red paper if needed.



A319/A320/A321
AIRCRAFT MAINTENANCE MANUAL

AC EXTERNAL POWER CONTROL (GPCU OR GAPCU) - MAINTENANCE PRACTICES

TASK 24-41-00-861-002

Energize the Aircraft Electrical Circuits from the External Power

WARNING : MAKE SURE THAT THE AIRCRAFT IS GROUNDED.

WARNING : MAKE SURE THAT ALL THE CIRCUITS IN MAINTENANCE ARE ISOLATED BEFORE YOU SUPPLY ELECTRICAL POWER TO THE AIRCRAFT.

CAUTION : DO NOT USE A GROUND POWER UNIT WITH A CAPACITY LESS THAN 90 KVA. IF YOU USE A LESS POWERFUL UNIT:
- AN OVERLOAD OF THE GROUND POWER UNIT COULD OCCUR
- IT COULD BE NECESSARY TO RESET MANY COMPUTERS ON THE AIRCRAFT.

1. Reason for the Job

NOTE : There are alternative methods for this procedure. This task gives one of the methods. For the other methods, refer to the other tasks in this page block.

2. Job Set-up Information

A. Fixtures, Tools, Test and Support Equipment

REFERENCE	QTY	DESIGNATION
98A24403000000	1	CABLE HOLDING STRAP

B. Referenced Information

REFERENCE	DESIGNATION
...ting/Recording	
...ance Operations	
...ptacle (20XG) (for	
... Receptacle (20XG)	

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APPLYING POWER TO THE AIRPLANE & AIRPLANE WARNING

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AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

3. Definitions

A. Definition of Terms
The following terms are used in the ESPM and are defined as follows:
R - Standard Practices:
R Standard industry practices that are not specific to AIRBUS aircraft.
R Procedures specific to AIRBUS aircraft and applicable to several
R systems.
R - Torque:
R The term torque is used when a procedure requires a specific torque
R value.
R
R - Tighten:
R The term tighten is used when no specific torque value is required.
R - WARNING:
R Calls attention to use of material, processes, methods, procedures or
R limits which must be followed precisely to avoid injury or death to

- WARNING:
Calls attention to use of material, processes, methods, procedures or limits which must be followed precisely to avoid injury or death to persons.
- CAUTION:
Calls attention to methods and procedures which be followed to avoid damage to equipment.

... followed to avoid

... r or provide

... ssible to access to
the ESPM information.
The P/Ns listed in the ESPM are made up of two parts:
- A basic element which is the standard number/family.
- A suffix which defines the item.
R
R e.g.

	basic element(standard)	+	suffix(item)	=	Full P/N
	NSA936504		TC0607		NSA936504TC0607
	ASNE0261		CF24		E0261CF24

R NOTE : For ASN standards, the 3 letters" A,S,N" are omitted in the P/N.
R For clarity, only the suffix (item)(e.g. TC0607) is shown in the
R tables.
R The full P/N is however identifiable since the applicable standard
R number is always mentioned on the page (in the title or/and on top
R of the table).
R

R NOTE : For tool military part number (MIL), the P/N shall consist of the
R letter M and of the basic specification number.

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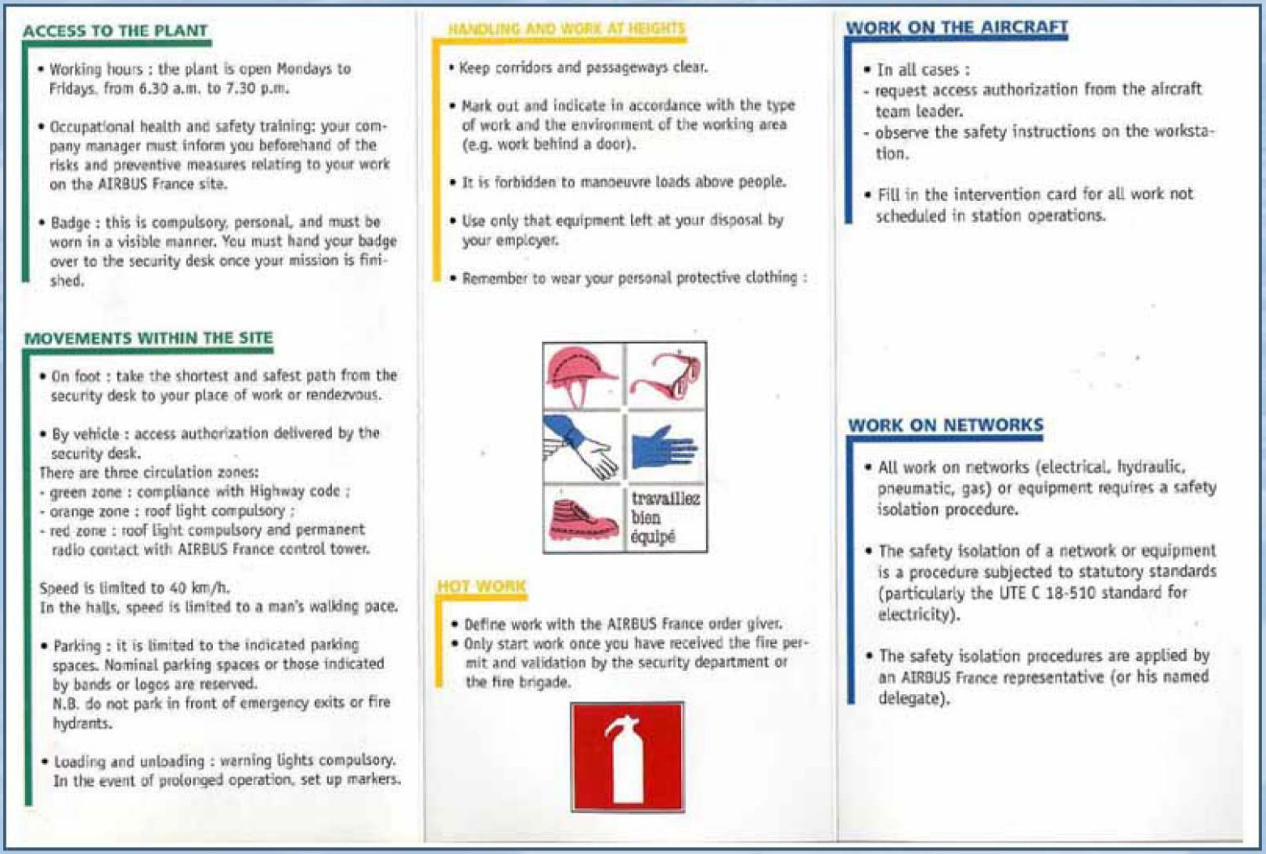
APPLYING POWER TO THE AIRPLANE & AIRPLANE WARNING



ACCESS TO THE PLANT

- Working hours : the plant is open Mondays to Fridays, from 6.30 a.m. to 7.30 p.m.
- Occupational health and safety training: your company manager must inform you beforehand of the risks and preventive measures relating to your work on the AIRBUS France site.
- Badge : this is compulsory, personal, and must be worn in a visible manner. You must hand your badge over to the security desk once your mission is finished.

MOVEMENTS WITHIN THE SITE

- On foot : take the shortest and safest path from the security desk to your place of work or rendezvous.
- By vehicle : access authorization delivered by the security desk.

There are three circulation zones:
- green zone : compliance with Highway code ;
- orange zone : roof light compulsory ;
- red zone : roof light compulsory and permanent radio contact with AIRBUS France control tower.

Speed is limited to 40 km/h.
In the halls, speed is limited to a man's walking pace.

- Parking : it is limited to the indicated parking spaces. Nominal parking spaces or those indicated by bands or logos are reserved.
  N.B. do not park in front of emergency exits or fire hydrants.
- Loading and unloading : warning lights compulsory. In the event of prolonged operation, set up markers.

HANDLING AND WORK AT HEIGHTS

- Keep corridors and passageways clear.
- Mark out and indicate in accordance with the type of work and the environment of the working area (e.g. work behind a door).
- It is forbidden to manoeuvre loads above people.
- Use only that equipment left at your disposal by your employer.
- Remember to wear your personal protective clothing :

travaillez bien équipé

HOT WORK

- Define work with the AIRBUS France order giver.
- Only start work once you have received the fire permit and validation by the security department or the fire brigade.

WORK ON THE AIRCRAFT

- In all cases :
  - request access authorization from the aircraft team leader.
  - observe the safety instructions on the workstation.
- Fill in the intervention card for all work not scheduled in station operations.

WORK ON NETWORKS

- All work on networks (electrical, hydraulic, pneumatic, gas) or equipment requires a safety isolation procedure.
- The safety isolation of a network or equipment is a procedure subjected to statutory standards (particularly the UTE C 18-510 standard for electricity).
- The safety isolation procedures are applied by an AIRBUS France representative (or his named delegate).

APPLYING POWER TO THE AIRPLANE & AIRPLANE WARNING

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Figure 001 (Sheet 1) / 20-10-00 - Safety Practices - Typical Tag

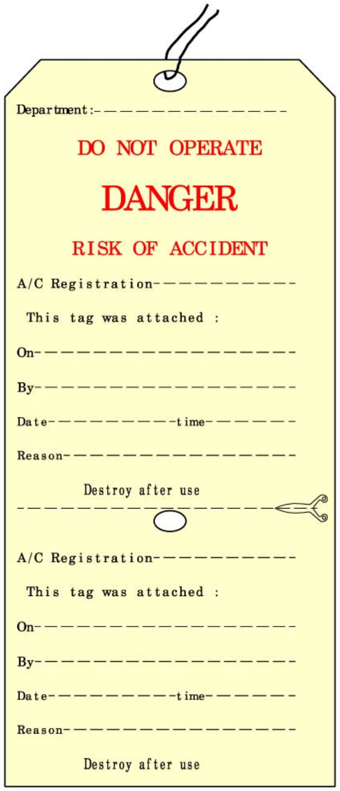

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Figure 001 (Sheet 1) / 20-10-00 - Safety Practices - Typical Tag

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SAFETY PRACTICES

HUMAN FACTOR

To conclude, AIRBUS recommends to strictly following theirs procedures given in the various documents.
We also recommend you to take care of yourself when you work on aircraft.
Effectively we know that due to routine there is a risk to forget some basic rules to protect yourself and the aircraft.

HUMAN FACTOR

HUMAN FACTOR

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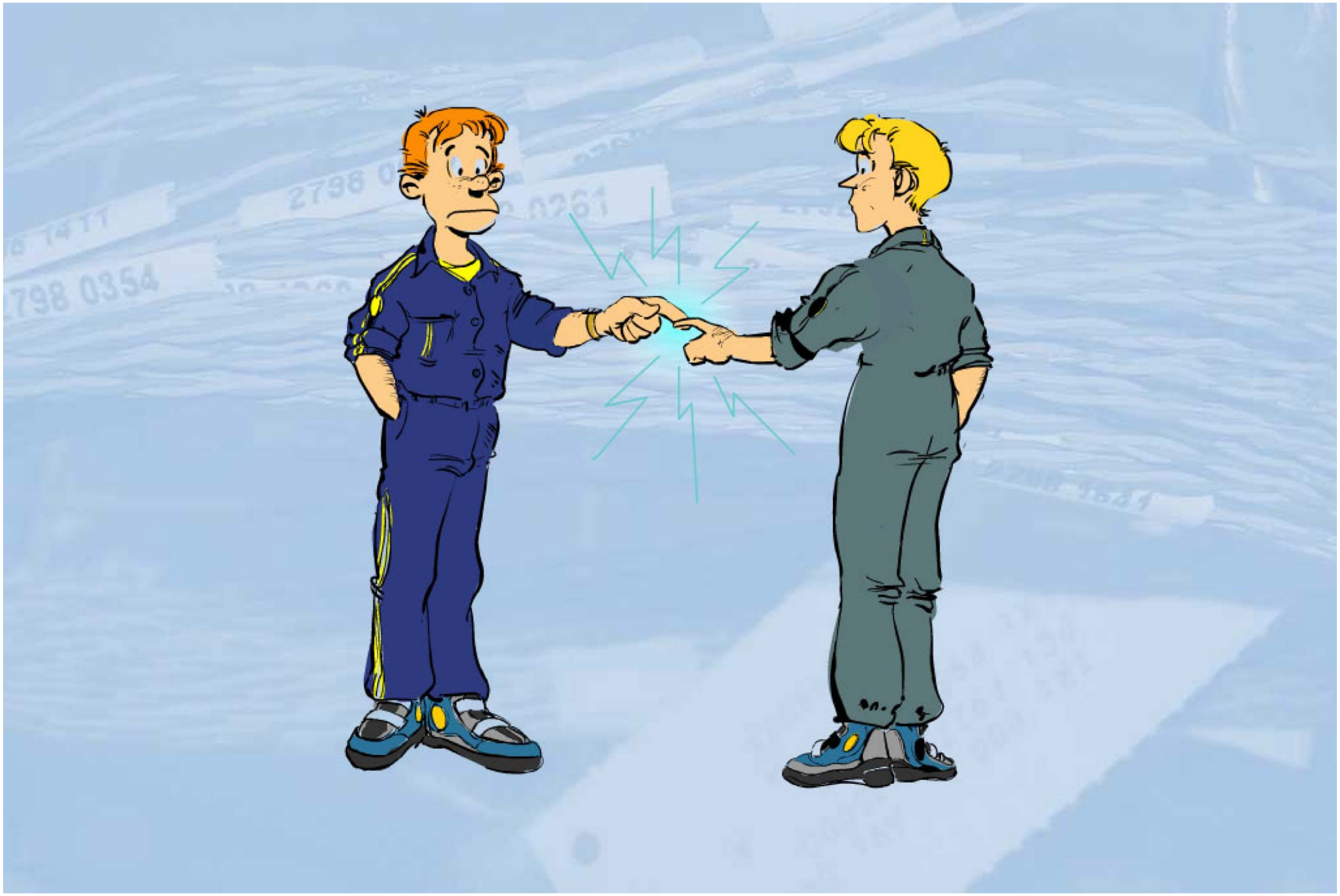
ESD HANDLING AND PROTECTION

SOURCES OF ELECTROSTATIC DISCHARGE

In this module you will have an overview of what is an Electrostatic discharge.
If you have ever been "shocked" after walking across a new carpet you have witnessed the creation of electrostatic charge and the effects of electrostatic discharge (ESD). For two kids trying to "shock" each other this can be great fun, but for modern electronics semiconductors the same effects can cause severe damage.
The physical contact and separation of two materials most commonly cause electrostatic charge. This physical contact can be rubbing, sliding, banging or other similar, intimate contact interaction. The contact and separation process transfers negatively charged surface electrons from one material to the other thereby creating a negative charge on one surface and a positive charge on the other.
This is called triboelectric charging and can occur virtually with any type of material.
This list shows some of the most common materials in the triboelectric series and their tendency towards charged polarization.



SOURCES OF ELECTROSTATIC DISCHARGE

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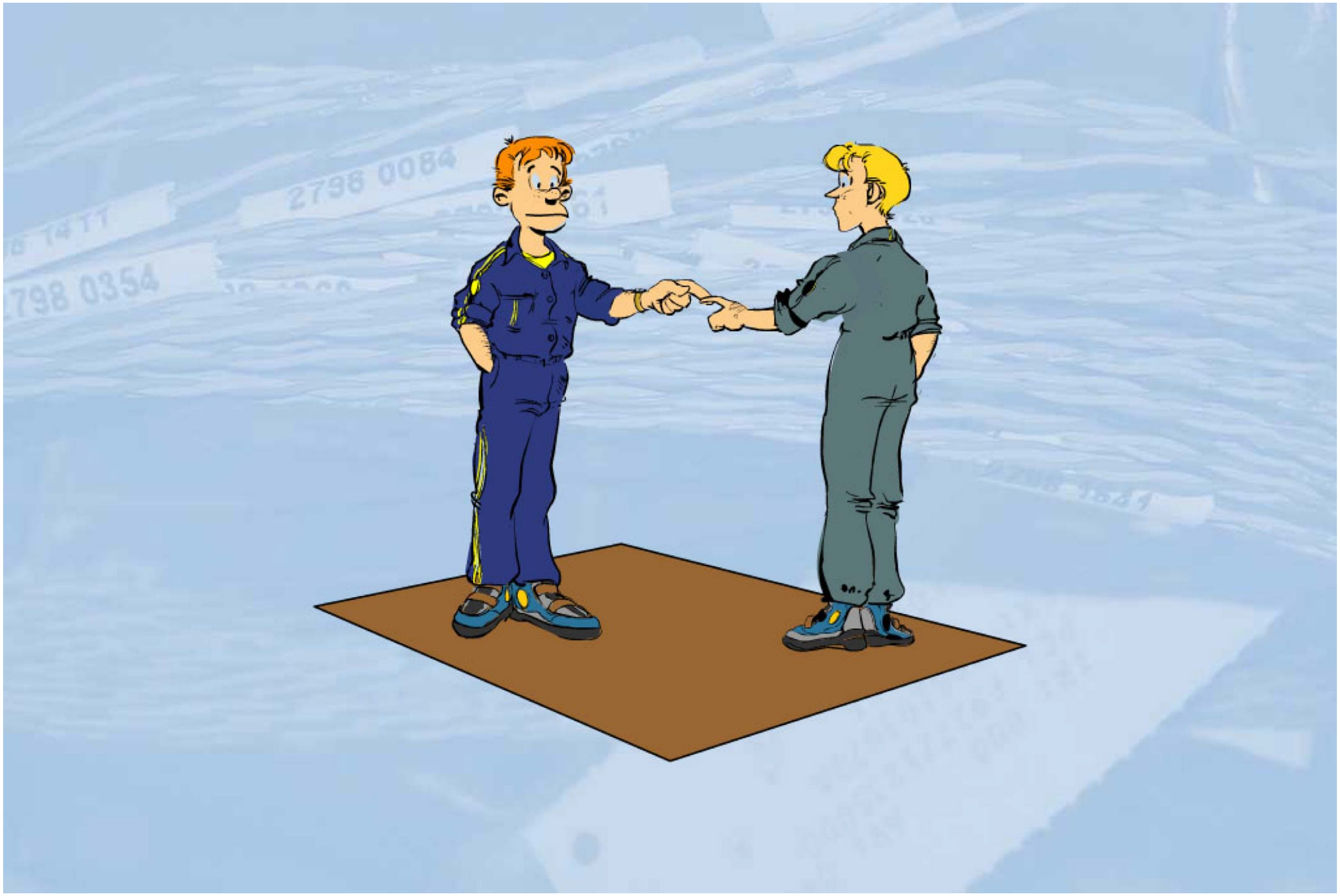

SOURCES OF ELECTROSTATIC DISCHARGE

SOURCES OF ELECTROSTATIC DISCHARGE

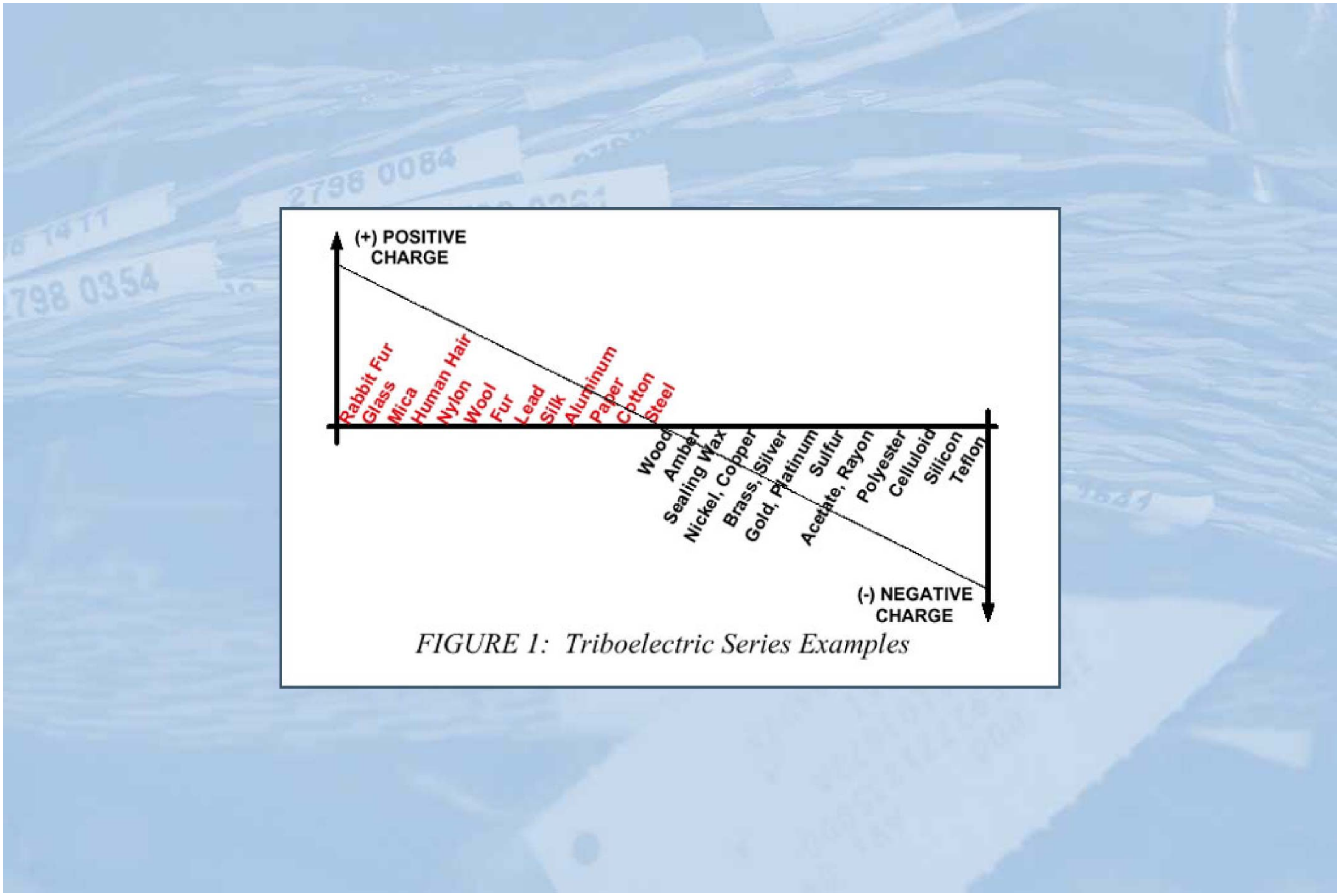

FIGURE 1: Triboelectric Series Examples

SOURCES OF ELECTROSTATIC DISCHARGE

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ESD HANDLING AND PROTECTION

APPLYING POWER TO THE AIRPLANE

ESD is the transfer of electrostatic charge from one material to another. This occurs when the two materials are of unequal charge levels.
The most common cause of electrostatic damage is the transfer of charge from the human body or a charged material directly to the ESDS device.
Electrostatic Discharge Precautions
Electrostatic discharge (ESD) can destroy or damage many electronic components, including integrated circuits and discrete semiconductor devices. Since certain devices are most susceptible to ESD damage than others, warning symbols, shown there are now used to identify ESD sensitive (ESDS) items.

APPLYING POWER TO THE AIRPLANE

APPLYING POWER TO THE AIRPLANE

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ESD HANDLING AND PROTECTION

ESDS SAFETY PROCEDURES

In order to protect the ESD sensitive devices, any accumulated charge on the body of the human operator should be discharged first before opening the protective container with ESDS devices inside. The common material used is the wrist-strap.
The discharge can be accomplished by putting a hand on a grounded surface or, ideally, by wearing a grounded antistatic wrist-strap.
The packing material for ESDS is out static plastic bags as you can see on theses examples.

PROTECTION FOR ELECTROSTATIC DISCHARGE SENSITIVE DEVICES

ESDS SAFETY PROCEDURES

EXAMPLES OF MATERIAL FOR DISSIPATING STATIC ELECTRICITY

Antistatic footwear.

Where a wrist-strap is impractical, e.g. the job requires the worker to walk from one location to another, it is recommended that antistatic footwear such as antistatic shoes or heel-straps are worn. The picture on the right shows an example of an antistatic heel-strap with the grounding cord running into the socks to make contact with the skin. It is also necessary to use an antistatic floor (e.g. conductive floor tiles) to work together with the antistatic footwear.

ESDS SAFETY PROCEDURES

EXAMPLES OF MATERIAL FOR DISSIPATING STATIC ELECTRICITY

ESDS SAFETY PROCEDURES

ESDS SAFETY PROCEDURES

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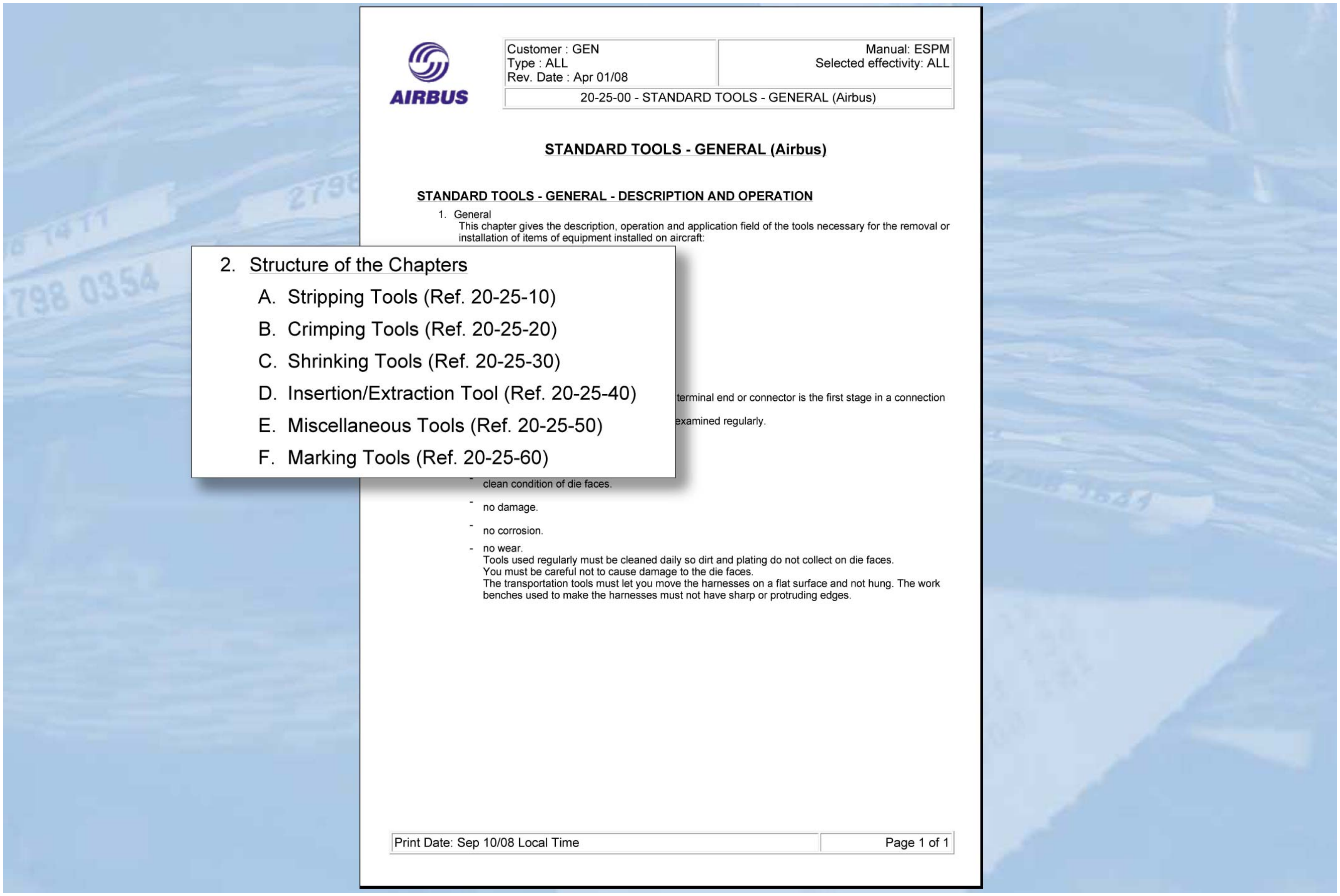
TOOLS - SPECIAL TOOLS AND EQUIPMENT

GENERAL AND TOOLS

In this module we will give you general information on the different tools used on the electrical installation of the AIRBUS aircraft.
As you can see in the ESPM there is a chapter dedicated to the Tools.
This first page of the standard tools chapter indicates you the structure of the chapters.
Concerning the stripping tools there is typical procedures to follow to make a correct stripping. The first part of the stripping chapter gives you general requirements.
The general requirements for the stripping of different wires type are given through figures.
These figures are always followed with text to be more accurate in the description of a correct stripping with all relevant warning and cautions when is necessary.
Particular stripping methods are explained.
In addition to method given for different types of wires there is a table of defects representation to help in the inspection of a stripping.
When a tool need to be modified, to have new dies for example, the ESPM gives also the information needed.
Concerning the crimping tools the information given are under the same principle.
As you can see here there is a typical procedure for the crimping with the checks to be done.
Illustrations are always a good help to facilitate the understanding.
Figures explain clearly what happen to the braid after crimping.

GENERAL AND TOOLS



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20-25-00 - STANDARD TOOLS - GENERAL (Airbus)	

STANDARD TOOLS - GENERAL (Airbus)

STANDARD TOOLS - GENERAL - DESCRIPTION AND OPERATION

1. General
   This chapter gives the description, operation and application field of the tools necessary for the removal or installation of items of equipment installed on aircraft:

2. Structure of the Chapters
   A. Stripping Tools (Ref. 20-25-10)
   B. Crimping Tools (Ref. 20-25-20)
   C. Shrinking Tools (Ref. 20-25-30)
   D. Insertion/Extraction Tool (Ref. 20-25-40)
   E. Miscellaneous Tools (Ref. 20-25-50)
   F. Marking Tools (Ref. 20-25-60)

terminal end or connector is the first stage in a connection

examined regularly.

- clean condition of die faces.
- no damage.
- no corrosion.
- no wear.
  Tools used regularly must be cleaned daily so dirt and plating do not collect on die faces.
  You must be careful not to cause damage to the die faces.
  The transportation tools must let you move the harnesses on a flat surface and not hung. The work benches used to make the harnesses must not have sharp or protruding edges.

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GENERAL AND TOOLS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-25-11 - GENERAL REQUIREMENTS FOR STRIPPING OF ELECTRICAL CABLES (Airbus)	

GENERAL REQUIREMENTS FOR STRIPPING OF ELECTRICAL CABLES (Airbus)

GENERAL REQUIREMENTS FOR STRIPPING OF ELECTRICAL CABLES DESCRIPTION AND OPERATION

1. General

   This topic gives the requirements and the miscellaneous procedures to strip different types and gauges of electrical cables that are installed on aircraft.
   You must strip conductors before all crimping or soldering operations.

   NOTE: For some cables, a specific stripping procedure is necessary to increase or decrease the cable diameter before you can do the procedure that follows (e.g. solder sleeve installation, crimping of contacts, etc.).

2. Definition

   The stripping operation must remove the insulation from the cable along a given length with tolerances. It must not cause damage to the core strands or the shielding and must not decrease the initial performance of the cable.
   The insulation must have a clean cut and not start tears or unwanted untwining of the insulating sheath.

   NOTE: You always strip a cable end almost immediately before the connection of the cable.
   Do not put stripped cables in storage.

3. Stripping Procedure

   A. Items to be Stripped:

   You can strip all the existing cable types (single core or multicore cables, standard, screened or coaxial cables).
   But the stripping procedure is not the same. There are differences for cables with a specific procedure due to the cable characteristics. These characteristics can be related to the materials in the cables, to their specific design in the case of coaxial cables (impedance) or to the type of each conductor part of the assembly in the case of specific single or multicore cables.
   Example:
   Multicore cable E0299 HD has a coaxial cable, plus a five-wire shielded cable, plus a single core.
   The wire or wires in a shielded cable will be dealt with as a single core cable after stripping and cutting to length of the cable shield .

   B. Stripping Length

   (Ref. Fig. 001)

   (1) Single core or each element of a multicore cable:
   The stripping length is related to the length necessary to connect the cable conductor to the end component. It is also related to the dimensions of the end component barrel plus the tolerances of the stripped cable aft of the barrel.
   This length "A" is given in the topic related to the use of each end component.
   The stripping tools are related to the gauge of the cable to be stripped.

   (2) Single core or multicore screened cables or coaxial cables:
   Stripping is in several steps:
   - Step 1: Stripping of the insulation (L stripping length)
   - Step 2: If necessary, stripping of the screening (L1 and L2 stripping lengths)
   - Step 3: Stripping of the conductor(s) (stripping length A)

   The miscellaneous stripping lengths are given in the topic related to the use of each end component.
   For step 1:

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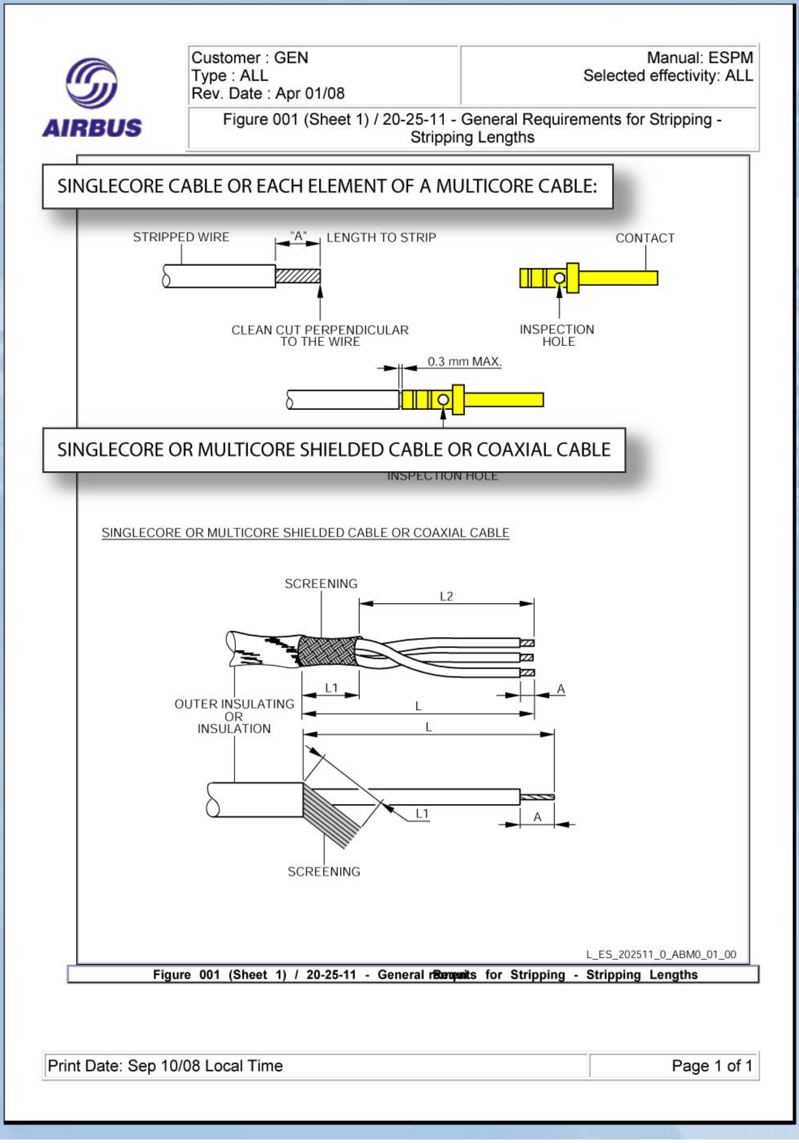
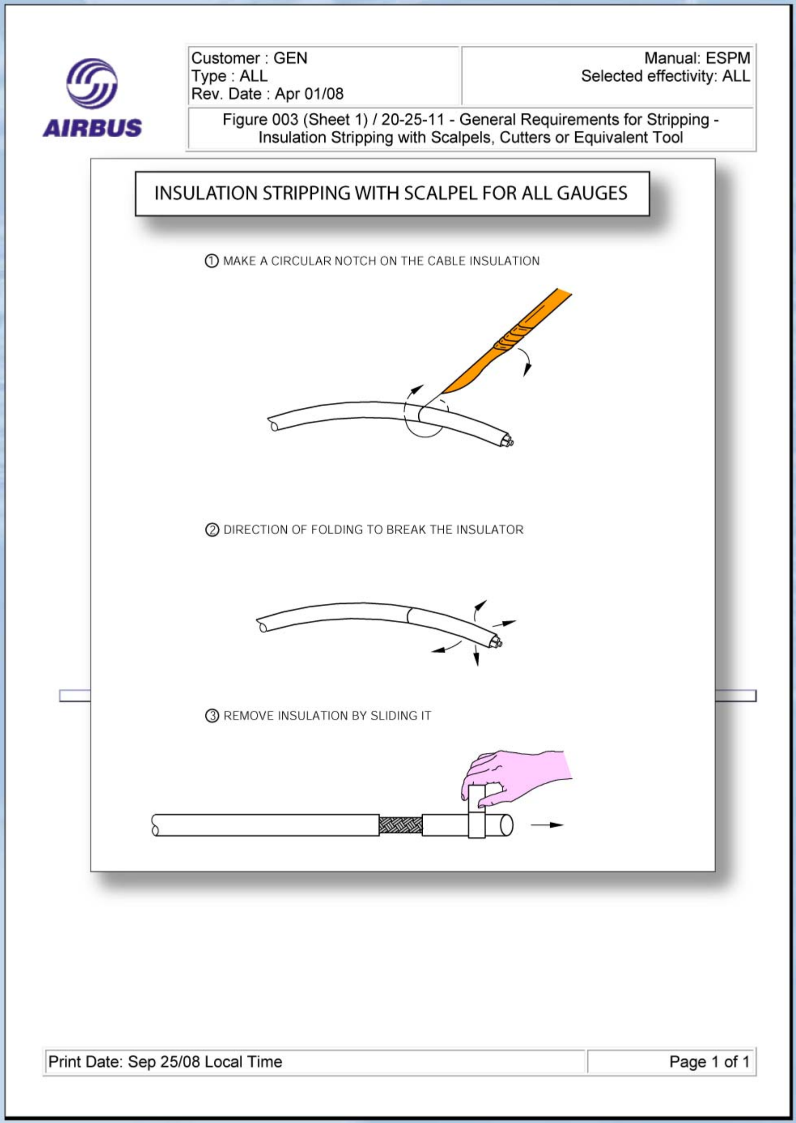
GENERAL AND TOOLS





GENERAL AND TOOLS

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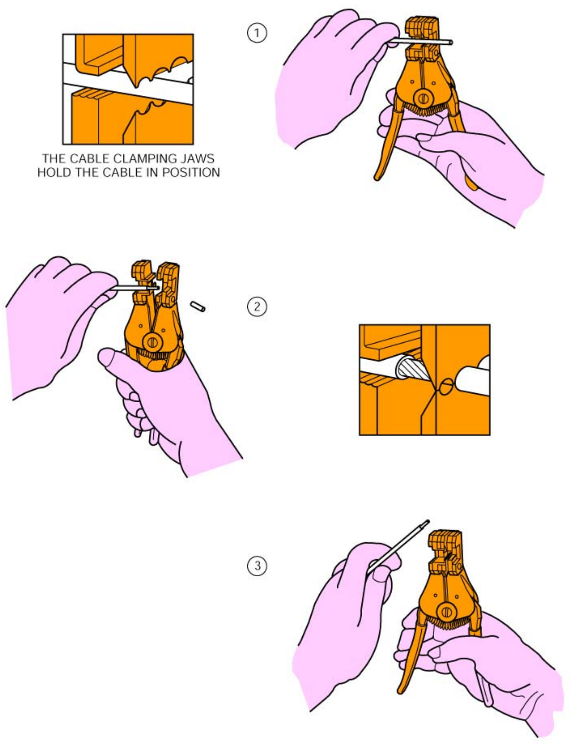
Figure 005 (Sheet 1) / 20-25-11 - General Requirements for Stripping - Stripping Procedure with STRIPMASTER Tool or Equivalent



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GENERAL AND TOOLS

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ELECTRICAL STANDARD PRACTICES MANUAL

(2) STRIPMASTER Tools or Equivalent
(Ref. Fig. 004)

CAUTION : MAKE SURE THAT YOU USE US STRIPPING TOOLS FOR STRIPPING OF US STANDARD WIRES.
IF YOU USE OTHER TOOLS, THERE IS A RISK OF DAMAGE TO THE CORE OR TO THE INSULATION OF THE WIRES.

for :
- wire gauge 12 to 26,
- single core cables or each element of a multicore cable that is a singlecore cable.

(b) Insulation stripping Procedure

- The end of the cable must have a clean cut.
- Determine the stripping length to be applied to the cable (in general rules, the wire must be visible through the inspection hole.
(Ref. Fig. 001)
- Determine the cavity to be used depending on the wire gauge of the cable to be stripped.
- Position the wire centrally in the appropriate cavity.
- Fully squeeze the tool handles.
- Release the handles for opening the blades and remove the stripped wire.
- After stripping, the wire strands should be twisted together in the same direction as the normal lay of the wire.

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GENERAL AND TOOLS

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C. Stripping procedure for each applicable tool :

CAUTION : MAKE SURE THAT YOU DO NOT CUT THE BRAIDED SHIELD OR CAUSE DAMAGE TO THE CENTER CONDUCTOR WHEN YOU STRIP THE CABLE.

CAUTION : DO NOT USE TOOLS THAT HAVE V-SHAPED OR SHEAR-TYPE KNIVES. THIS TYPE OF KNIFE CAN CAUSE DAMAGE TO CABLES.

(1) Scalpels, cutter, cable knife or Equivalent :

WARNING : BE VERY CAREFUL WHEN YOU USE THESE TOOLS. THEY ARE SHARP AND CAN CUT YOU.

NOTE : During the stripping operation, to obtain a good stripping quality, the cable must be held at right angles to the blades and the insulation must be removed parallel to the cable axis.

(a) Conditions of application
Manual insulation stripping with cutting tools is allowed for :
- cables of cross section above 5 mm2 or wire gauge 10,
- fire resistant cable insulation,
- screened cables (braided screening or helical screening),
- coaxial cables.

(b) Insulation stripping Procedure
(Ref. Fig. 002)
- The end of the cable must have a clean cut.
- Determine the location where the insulation must be cut, using a scalpel, without pressing, make a circular notch on the cable insulation to start cutting the insulation.
- Fold the cable on the notch to break the insulation.
- By hand or using a sticky paper or an appropriate tool not to damage the conductor, pinch the cable end on the insulation and remove it.

(c) Screening stripping procedure
(Ref. Fig. 003, 004)
Depending on the screening type of the cable and/or the type of screening pick-up to be made, several methods of screened stripping are possible.

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GENERAL AND TOOLS

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ELECTRICAL STANDARD PRACTICES MANUAL

1 Cutting flush the insulator, method :

... insulator, bring back the strands in the cable direction.
- Depending on the type of cable, slide a heat-shrinkable sleeve or a crimp-on the sleeve specified in the wiring documents over the shielding end.

2 Window type stripping method :

Only solder sleeves are to be fitted to this type of stripping.
This stripping method allows the screening pick-up to be stepped more easily in the case of a high number of screened cables :

Cutting method :
- Make 3 circular notches over a length "L" with respect to the sleeves used.
- Make a longitudinal notch and remove the pieces of insulation.
- The solder sleeve will be moved and positioned on the screening.

Sliding method :
- Make a circular notch.
- Slide the insulation on the screening over a length "L" and leave it in position.
- This length "L" depends on the length of the solder sleeve used.
- The solder sleeve will be moved and positioned on the screening.

3 Wrapping and cutting method :

Mechanical ferrules or solder sleeves can be equally fitted to a stripped tubing on a cable end.
- After the insulation over a length "L" has been stripped.
L : length necessary, as short as possible but sufficient, for further work (pinning, unpinning, repairs, etc...).
- Unwind the braided screening and cut at the length "L1" or wind the helical screening over the length "B".
L1/L2 : length with respect to the type of end component (mechanical ferrule solder sleeve).
- The solder sleeve will be moved and positioned on the screening.
These methods depend on the end component to be connected, they are specified and given in the topic relevant to these end components.

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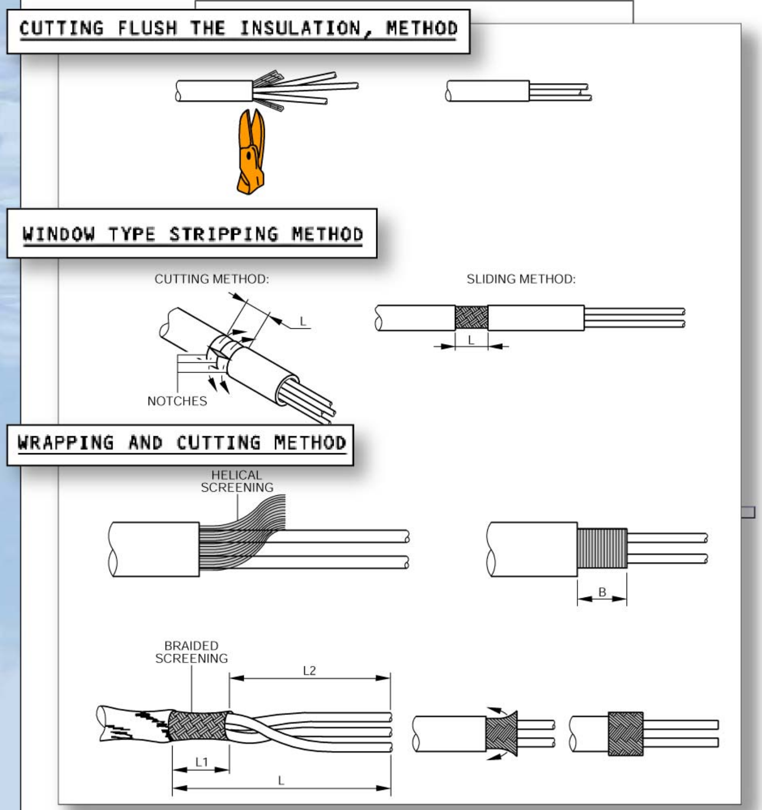
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 004 (Sheet 1) / 20-25-11 - General Requirements for Stripping - Screening Stripping with Scalpels, Cutters or Equivalent Tool	



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GENERAL AND TOOLS

AIRBUS INDUSTRIE

D. Specific requirements and faults for Stripping (Ref. Fig. 005)

(1) General requirements and faults :

Do a check for defects on the cable, a cable showing no damage to preserve its mechanical and electrical characteristics.
The cable end must be clean cut, straight and perpendicular to the cable length.
The tool used must be in the correct operating condition and be applicable to the cable type.

(b) During stripping

The cable must be held perpendicular to the knives and the insulator separation must be parallel to the cable center line.

(c) After stripping

The stripped cable end must be almost immediately connected to prevent damage to the strands of the stripped area.
The stripped length must enable the end component specified to be correctly connected.
Straight cut of the core, perpendicular to the axis of the cable.
There must be no marks on the core of the stripped wire, no visible base metal and the strands must not be marked, cut or damaged. It is not permissible.
The insulation remaining on the cable must be free from damage to the insulation.
The insulation must be cleanly cut and not start tears or unwanted untwining of the insulating sheath.
If the wire is damaged, cut off the damaged section and re-start

(2) Particular requirements for specific cables :

(a) Aluminum cables

Very strict instructions concerning the risks of cable oxidation must be applied.
If possible cut the end of the cable and check that the strands are free from oxidation spots.
Shrink a heat shrink sleeve on the cable end and hot pinch this sleeve to make sure it is sealed to protect it if it is not used.
The stripping length is the same and given in the topic relevant to the end components.

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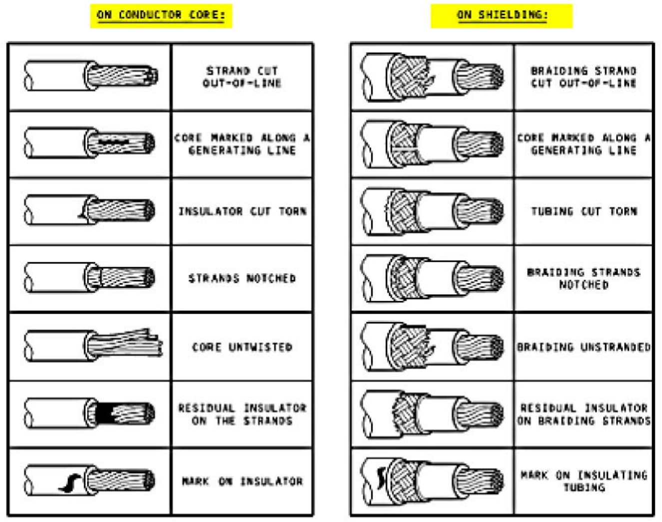

NOTE: THE ABOVE SKETCHES, SHOWING A SINGLECORE CABLE, ALSO APPLY TO MULTICORE CABLES AND COAXIAL CABLES.

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General Requirements for Stripping - Unacceptable Stripping Defects Representation
Figure 005

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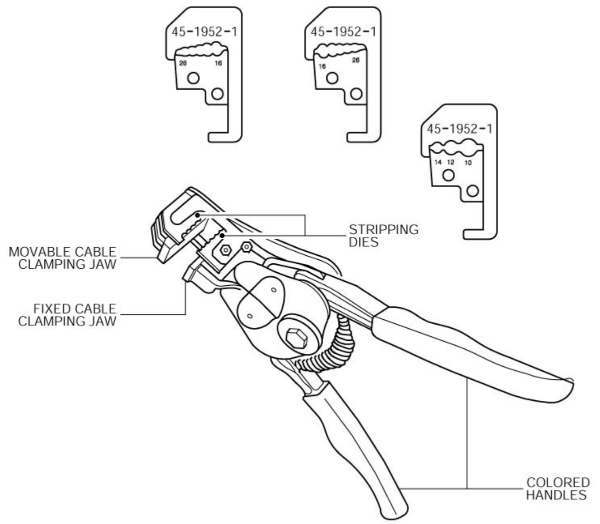
GENERAL AND TOOLS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-25-12 - Stripping Tools - STRIPMASTER Tool or Equivalent	



NOTE: WHEN IT IS NECESSARY TO CHANGE THE DIES, YOU MUST ALWAYS CHANGE THE TWO PARTS. AFTER YOU CHANGE THE DIES, SAMPLES MUST BE MADE AND EXAMINED.

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Figure 002 (Sheet 1) -25-12 - Stripping Tool- STRIPMASTER Tool or Equival

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GENERAL AND TOOLS

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ELECTRICAL STANDARD PRACTICES MANUAL

D. Position of Wire Insulation after Crimping (Barrel Closed) and (Open Barrel)

3. Procedure

A. Pre-crimping checks

(1) Wire shall be correctly stripped (Ref.Chapter. STRIPPING TOOL).

(2) Check correct combination of cable, tool, terminal end or connector.

(a) Crimping tool and locator shall be correctly selected (Ref. CRIMPING TOOLS tables).

(b) Before use, every tool shall be checked for:
- Identification (tool serial No.) with its own particular history card. The tool used will not nave exceeded 1000 crimps on an interval of 12 months without being tested, unless otherwise stated,
- cleanliness of die faces,
- freedom from damage,
- freedom from corrosion,
- freedom from wear. Tools in regular use shall be cleaned daily to avoid build up of dirt and plating on die faces. Care shall be taken not to damage the die faces.

B. Post-crimping checks

(1) All crimped joints shall conform with the following visual checks:
- Correctness of form and location of crimp,
- freedom from facture and rough or sharp edges,
- burrs are inherent in some forms of crimping, (These burrs should not be excessive to the extend that they cannot be removed without the use of a tool),
- crimping indents away from inspection hole,
- crimping indent correctly centered on the barrel,
- no damage caused on the attaching system, or to the female contact pressure system (removable contacts)
- acceptable geometrical distortion, correct die mark,
- wire visible through inspection hole, if applicable,
- position of insulation after crimping, (Ref. Fig. D02)
- position of wire after crimping, (Ref. Fig. D03)

EFF : ALL

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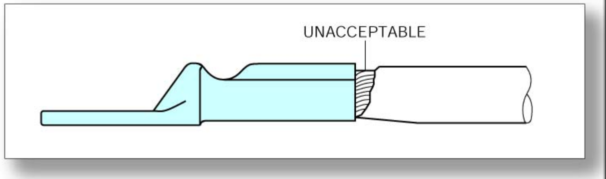
GENERAL AND TOOLS

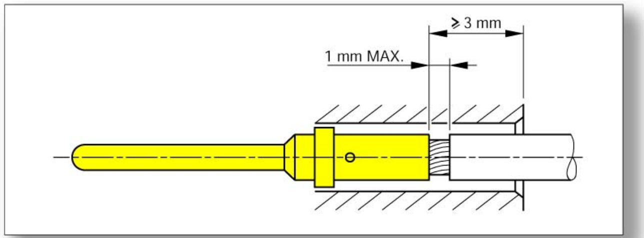
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-25-21 - Position of Wire Insulation after Crimping (Closed Barrel)

ON COMPLETION OF THE CRIMPING OPERATION, THE WIRE INSULATION MUST NOT BE PUSHED BACK OUT OF THE END FITTING AND/OR ITS SEALING SYSTEM.



THE DISTANCE BETWEEN THE CRIMPING BARREL AND THE WIRE INSULATION MUST BE LESS THAN 1 mm.



IN SPECIFIC CASES WHERE, BY CONSTRUCTION, THE DISTANCE BETWEEN REAR FACE OF THE HARD INSULANT IS LESS THAN 3 mm, THIS VALUE IS BROUGHT TO 0.3 mm MAX.

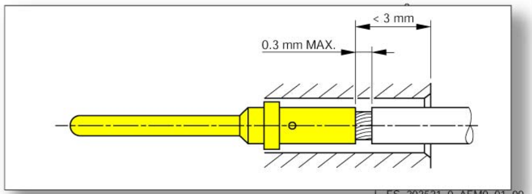


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Figure 003 (Sheet 1) / 20-25-21 - Position of Insulation after Crimping (Closed Barrel)

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GENERAL AND TOOLS

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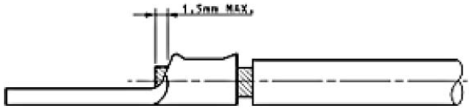
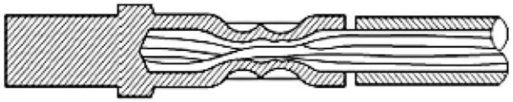
ELECTRICAL STANDARD PRACTICES MANUAL



THE MAXIMUM DISTANCE TOLERATED FOR THE EXTENSION OF THE WIRE CORE OUT OF THE CRIMPING BARREL, CONNECTION SIDE, IS 1.5mm.



CRIMPED CONTACT

5 20 25 21 0 AGM0 01

Position of Wire after Crimping (Open Barrel)
Figure 003

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GENERAL AND TOOLS

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TOOLS - SPECIAL TOOLS AND EQUIPMENT

SPECIALIZED TOOLS

When there is a particular process or when it is necessary (due to the utilization difficulty of a tool) we give the procedure as regard to the tool as you can see in this example for the CBT 600.
As another example you have here the procedure for a family of tools.
Theses tools are hydraulic hand crimping tools.
This is another example of a particular tool.
You have here for this tool to check the oil level and its position to make a correct crimping.
In addition to that you have to install correctly the head by paying attention to the procedure described.
And, finally, another crimping machine.
Concerning wiring tools (guns) you can see here that we give all necessary explanations.
The adjustment of the selector depending on the cable tie dimension is given in the table.
The figures show more precisely where and how the selector must be depending on gun part number.
To conclude, the tooling chapter gives you a good summary of the procedures used to correctly use the tools.

3. CANNON Crimping Tools Model CBT600 and CBT600B

(Ref. Fig. 002)
The model CBT600 is an air-operated crimping tool which can be operated with a hand valve or foot valve.
It can also operate as a portable crimping tool.
A basic model CBT600 crimps any contact size 12 through size 4 at the air line pressure of 80 to 100 PSI.
The model CBT600B crimps contacts size 0 at the air line pressure of 120 PSI.
The tool must be equipped with an air line filter and lubricator for optimum performance.

B. Locator Part Numbers

CONTACT SIZE	POWER CRIMP TOOL	CRIMP HEAD	LOCATOR	GAUGE
12	CBT600	CCH-12-7	CCHP-12-2	--
8	OR	CCH-8-1	CCHP-8-1	CCH-8-1
4	CBT600B	CCH-4-1	CCHP-4-1	CCH-4-1
0	CBT600B	CCH-0-1	CCHP-0-9	CCH-0

C. Example of Crimping

(1) Insert the locator into the power unit.

(2) Install the correct crimping head in the power unit and screw the collar tight.

(3) Cycle the tool twice, tightening the collar after each cycle to insure that the head is in the proper position for crimping.

(4) Place stripped wire into a contact and insert into the locator.

(5) Depress either the foot or hand valve to crimp. The tool automatically makes a full cycle crimp.

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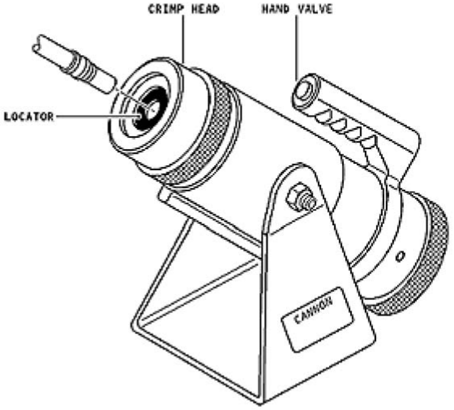

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CANNON Crimping Tool
Model CBT600 and CBT600B
Figure 002

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SPECIALIZED TOOLS

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
HYDRAULIC HAND CRIMPING TOOLS - DESCRIPTION AND OPERATION

1. List of Described Tools
   - Hand Hydraulic Crimping Tool P/N 69061, 69062, 69062-2 and 59975-1

2. Hand Hydraulic Crimping Tool P/N 69061, 69062, 69062-2 and 59975-1
   (Ref. Fig. 001)

A. Installation of Crimping Dies or Nests

gauge 8 to 2.
Correct positioning of dies is performed as follows :

(1) Press latch to open crimping head.

(2) Pull back nest lock and rotate thumb knob until the desired nest is obtained.

(3) With nest properly located, nest lock will spring back into position. If not the case, nest lock will not spring back into position and crimping head will not close.

(4) Close crimping head.

B. Example of Crimping

(1) Open pressure relief valve for a few seconds to ensure that indenter is located in neutral position. Close pressure relief valve.

(2) Locate splice between indenter and nest, with brazed seam facing indenter.

(3) Using short pumping strokes, pump handles sufficiently to hold splice in position without deforming barrel.

(4) Insert stripped end of wire into splice barrel.

(5) Continue pumping strokes until handles require less effort to pump showing that pressure relief valve operates and that crimping cycle is complete.

(6) Open pressure relief valve lever until indenter returns to neutral position.

(7) Open crimping head and remove crimped assembly.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-25-23 - Hand Hydraulic Crimping Tool P/N 69061, 69062, 69062-2 and 59975-1

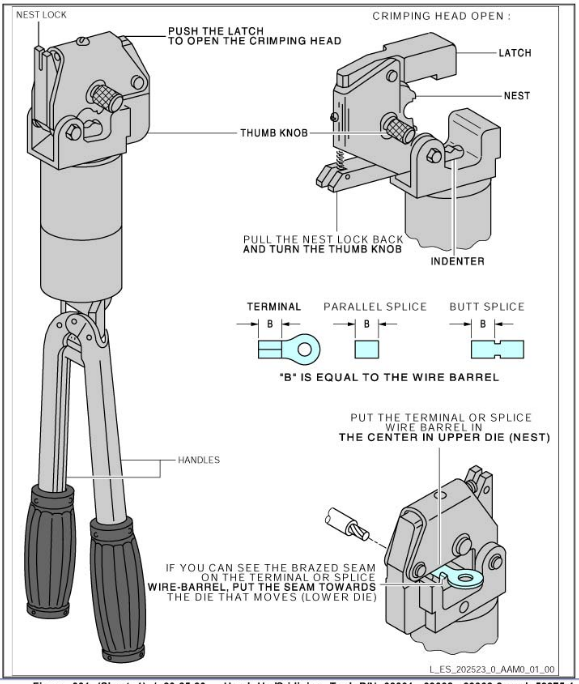

Figure 001 (Sheet 1) / 20-25-23 - Hand Hydraulic Crimping Tool P/N 69061, 69062, 69062-2 and 59975-1

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SPECIALIZED TOOLS

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ELECTRICAL STANDARD PRACTICES MANUAL

MISCELLANEOUS CRIMPING TOOLS - DESCRIPTION AND OPERATION

- AMP Hydraulic Foot Pump P/N 781019 or 69064
- AMP Electric/Hydraulic Crimping Machine P/N 69120

2. AMP Hydraulic Foot Pump P/N 781019 or 69064
(Ref. Fig. 001)
Hydraulic foot pumps P/N 781019 or 69064 are used for crimping of splices, connections and terminals listed below.
High temperature parallel splices.
High temperature wire splices.
Termalum butt splices, for aluminum RB wire.
Stratotherm flag terminal.
Copalum terminal.

A. Preparation of Tool

(1) Place foot pump in a vertical position with dipstick nut uppermost.

(2) Remove dipstick.

(3) Check that oil level corresponds with notch on dipstick, top up oil level if necessary.

(4) Install dipstick and place tool in horizontal position.

B. Example of Crimping

NOTE : : Always use tool in horizontal position.

(1) Remove cap from crimping head adapter.

(2) Slowly pump foot pedal until oil appears at end of hose.

(3) Connect crimping head to hose adapter
(Ref. Fig. 002)

(4) Install dies in crimping head.

(5) Place terminal or splice in dies.

(6) Lift reset pedal then return to down position.

(7) Pump foot pedal until terminal or splice is lightly held in position in dies.

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AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-25-29 - AMP Hydraulic Foot Pump P/N 781019 (ex 69064) or 523199-3

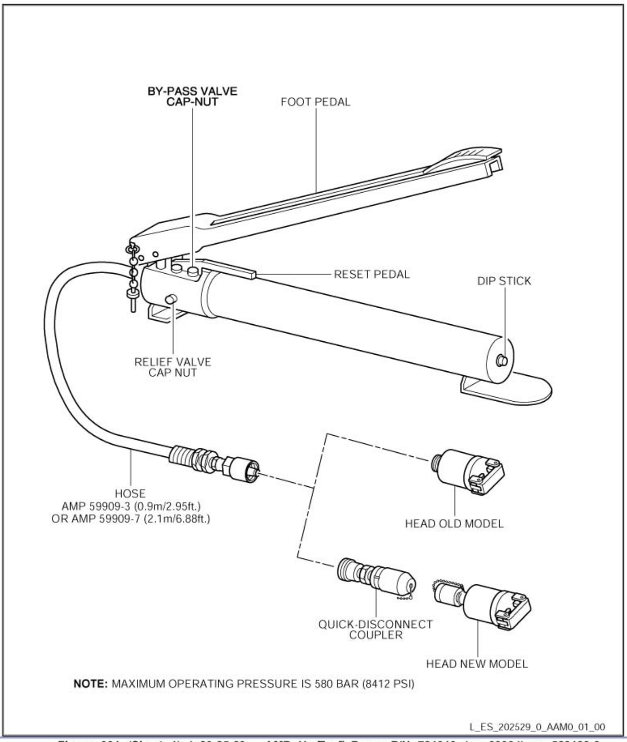

Figure 001 (Sheet 1) / 20-25-29 - AMP Hydraulic Foot Pump P/N 781019 (ex 69064) or 523199-3

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SPECIALIZED TOOLS

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-25-29 - AMP Crimping Head P/Ns 58422-1 (ex 69993 or 69066), 69051 and 69099

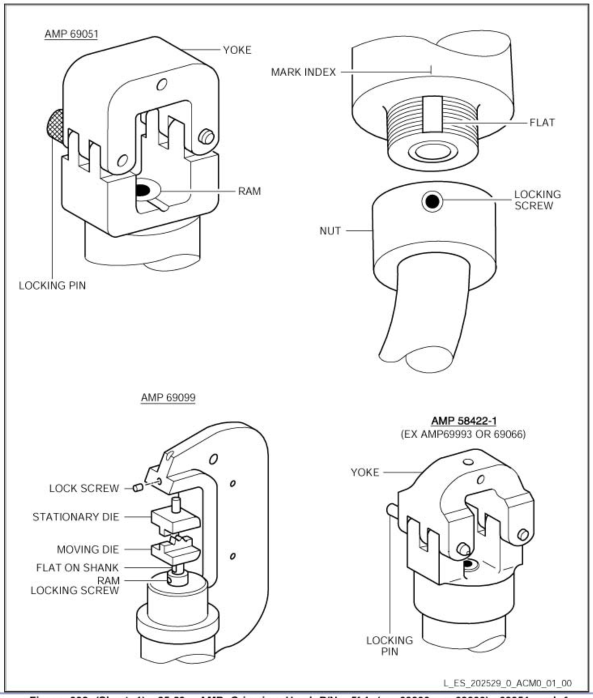

Figure 002 (Sheet 1) -25-29 - AMP Crimping Head P/Ns 5ℓ-1 (ex 69993 or 69066), 69051 and 6

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SPECIALIZED TOOLS

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ELECTRICAL STANDARD PRACTICES MANUAL

(8) Insert stripped end of wire into terminal or splice.

(9) Pump foot pedal until by-pass valve opens and the ram returns to neutral position.

(10) Open crimping head and remove terminal or splice. Before processing each crimp, press reset handle fully down and repeat foregoing steps. When last crimp is completed, release pressure and remove crimping head.
Install caps on crimping head and hose.

3. AMP Electric/Hydraulic Crimping Machine P/N 69120

A. Designation
AMP electric/hydraulic crimping machine P/N 69120 is used for crimping:
- Splices
- Terminals
- Crimp sleeves/ferrules

(1) Power control is accomplished by means of a handle or a foot switch, in this case, adapter P/N 47206 must be used.

(2) Motor voltage is 110 volts (P/N 69120-1) or 220 volts (P/N 69120-2).

B. Example of Crimping
(Ref. Fig. 003)
Always keep unit in upright position.
Never operate unit without its crimping head.

(1) Remove protective caps.

(2) Attach crimping head to handle control or to coupling adapter if foot switch is used.

(3) Place dies in crimping head.

(4) Using the hand control to advance the ram, press and release reset button then press trigger or, using the foot control, press and release reset pedal (LH) and then press ram advance (RH) pedal.

(5) Locate terminal or splice in dies and advance ram sufficiently to hold terminal or splice in the dies, by operating with short strokes trigger or pedal. The ram will not return to neutral until the crimping cycle is completed unless pressure release button on electrical control box is pressed.

(6) Insert stripped wire into terminal or splice.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 003 (Sheet 1) / 20-25-29 - AMP Electric/Hydraulic Crimping Machine P/N 69120	

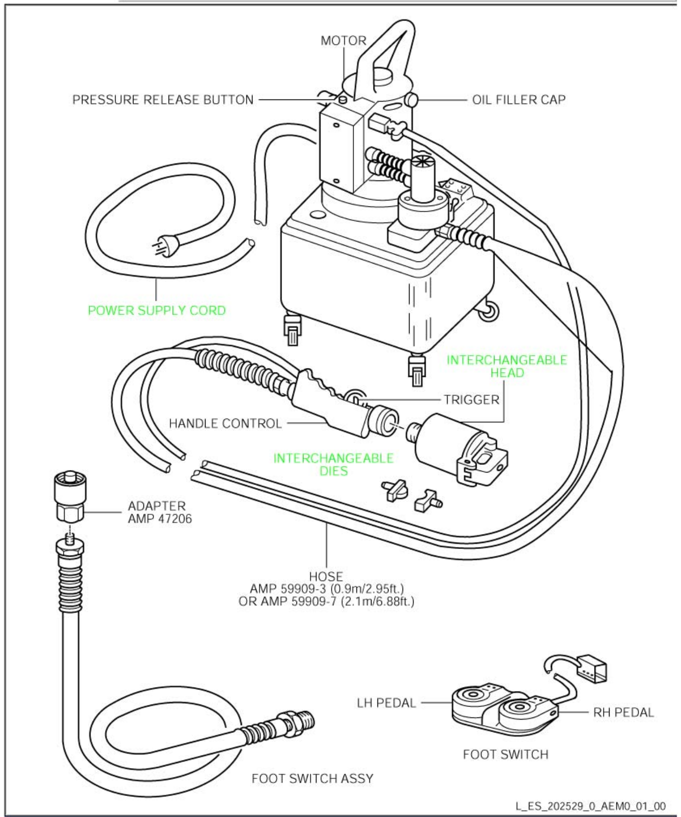

Figure 003 (Sheet 1) ‑25-29 - AMP Electric/Hydraulic Crimping Machine P/N 6!

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SPECIALIZED TOOLS

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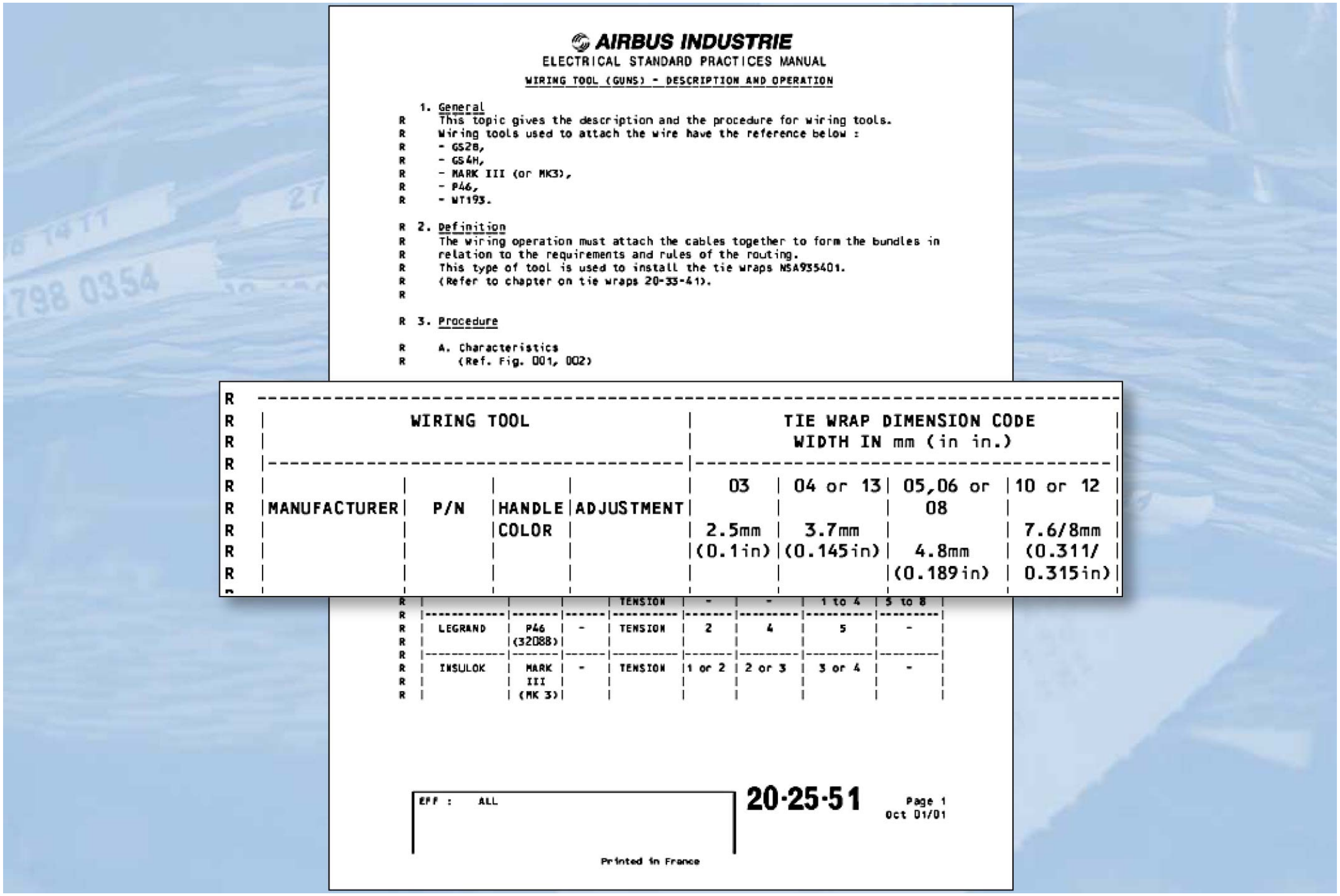

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ELECTRICAL STANDARD PRACTICES MANUAL

WIRING TOOL (GUNS) - DESCRIPTION AND OPERATION

1. General

This topic gives the description and the procedure for wiring tools.
Wiring tools used to attach the wire have the reference below :
- GS2B,
- GS4H,
- MARK III (or MK3),
- P46,
- WT193.

2. Definition

The wiring operation must attach the cables together to form the bundles in relation to the requirements and rules of the routing.
This type of tool is used to install the tie wraps NSA935401.
(Refer to chapter on tie wraps 20-33-41).

3. Procedure

A. Characteristics
(Ref. Fig. 001, 002)

WIRING TOOL				TIE WRAP DIMENSION CODE WIDTH IN mm (in in.)			
MANUFACTURER	P/N	HANDLE COLOR	ADJUSTMENT	03 2.5mm (0.1in)	04 or 13 3.7mm (0.145in)	05,06 or 08 4.8mm (0.189in)	10 or 12 7.6/8mm (0.311/ 0.315in)
			TENSION	-	-	1 to 4	5 to 8
LEGRAND	P46 (32088)	-	TENSION	2	4	5	-
INSULOK	MARK III (MK 3)	-	TENSION	1 or 2	2 or 3	3 or 4	-

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SPECIALIZED TOOLS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-25-51 - Wiring Tool (guns) - Description GS2B, GS4H (PANDUIT)	

PANDUIT GS4H:
HAND TOOL FOR 4.6 TO 8.9 mm (0.1811 TO 0.3503 in) WIDE STRAPS
GS4H-120:
FOR STRAP WIDTH OF MORE THAN 8.9 mm (0.3503 in)

SELECTOR KNOB: (FOR GS4H AND GS2B)
USED TO SELECT A PRESELECTED TENSION IN RELATION TO THE WIDTH OF THE TIE WRAP

FOR EACH WIDTH ADJUSMENT, YOU CAN TURN TO SELECT A MORE ACCURATE TENSION (CLOCKWISE TO INCREASE, ANTI-CLOCKWISE TO DECREASE)

PANDUIT GS2B:
HAND TOOL FOR 2.4 TO 4.8 mm (0.0944 TO 0.1889 in) WIDE STRAPS

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Figure 001 (Sheet 1) / 20-25-51 - Wiring Tool (guns) - Description GS2B, GS4H (PANDUIT)

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-25-51 - Wiring Tool (guns) - Description MK3 (Insulok), P46 (Legrand) and WT193 (Thomas & Betts)	

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Figure 002 (Sheet 1) / 20-25-51 - Wiring Tool (guns) - Description MK3 (Insulok), P46 (Legrand) and WT193 (Thomas & Betts)

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SPECIALIZED TOOLS

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-25-00 - STANDARD TOOLS - GENERAL (Airbus)	

STANDARD TOOLS - GENERAL (Airbus)

STANDARD TOOLS - GENERAL - DESCRIPTION AND OPERATION

1. General
   This chapter gives the description, operation and application field of the tools necessary for the removal or installation of items of equipment installed on aircraft:
2. Structure of the Chapters
   A. Stripping Tools (Ref. 20-25-10)
   B. Crimping Tools (Ref. 20-25-20)
   C. Shrinking Tools (Ref. 20-25-30)
   D. Insertion/Extraction Tool (Ref. 20-25-40)
   E. Miscellaneous Tools (Ref. 20-25-50)
   F. Marking Tools (Ref. 20-25-60)
3. Checking Procedure

   NOTE: The correct combination of cable, tool, terminal end or connector is the first stage in a connection procedure.
   The tools used must be approved and examined regularly.

   Before use, you must examine each tool for:
   - identification (tool Serial No.).
   - clean condition of die faces.
   - no damage.
   - no corrosion.
   - no wear.
     Tools used regularly must be cleaned daily so dirt and plating do not collect on die faces.
     You must be careful not to cause damage to the die faces.
     The transportation tools must let you move the harnesses on a flat surface and not hung. The work benches used to make the harnesses must not have sharp or protruding edges.

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SPECIALIZED TOOLS

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SPECIALIZED TOOLS

CALIBRATION - CERTIFICATION OF TOOLS

TOOLS REQUIRING CERTIFICATION

In this module we will see the verification and the calibration of the tools.
All the tools used to work on the electrical installation must be checked.
A typical check you can easily do is the check of the general aspect.
Concerning the stripping tools there is typical procedures to follow to make a correct stripping. The first part of the stripping chapter gives you general requirements.
But depending on the tool these checks must be done at determined intervals.
For example a Daniels crimping tool must be checked every one year by technicians.
In AIRBUS production line, the crimping tools are checked at regular short intervals like you can see on these photos.
These short intervals are due to the important utilization.

TOOLS REQUIRING CERTIFICATION

TOOLS REQUIRING CERTIFICATION

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D. Position of Wire Insulation after Crimping (Barrel Closed) and (Open Barrel)
(Ref. Fig. 002, 003)

3. Procedure

A. Pre-crimping checks

(1) Wire shall be correctly stripped (Ref.Chapter. STRIPPING TOOL).

(2) Check correct combination of cable, tool, terminal end or connector.

(a) Crimping tool and locator shall be correctly selected (Ref. CRIMPING TOOLS tables).

(b) Before use, every tool shall be checked for:
- Identification (tool serial No.) with its own particular history card.
  The tool used will not nave exceeded 1000 crimps on an interval of 12 months without being tested, unless otherwise stated,
- cleanliness of die faces,
- freedom from damage,
- freedom from corrosion,
- freedom from wear.
  Tools in regular use shall be cleaned daily to avoid build up of dirt and plating on die faces.
  Care shall be taken not to damage the die faces.

...isual checks:

...that they cannot

...female contact

- acceptable geometrical distortion, correct die mark,
- wire visible through inspection hole, if applicable,
- position of insulation after crimping,
  (Ref. Fig. 002)
- position of wire after crimping,
  (Ref. Fig. 003)

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TOOLS REQUIRING CERTIFICATION

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- no strands outside the crimping barrel (and/or extending out the inspection hole),
- no cut strands,
- adequate insertion of conductor strands in barrel where it is possible to check without damaging conductor,
- absence of damage to the conductor.

NOTE : It is recommended that each crimp has a gentle manual pull applied in order to establish there is no movement of conductor within the crimp.
Due consideration must however be given to the size of cable under inspection.

4. Periodic Tests

A. Test Intervals

- Each new tool before use shall be submitted for gauging, where applicable, and specimen checks.
- Each tool shall be submitted for gauging at 1000 and 2000 crimps and only if successful, returned for use. The checking at 3000 crimps shall be by gauging and specimen checks. This procedure shall be followed at subsequent 1000 crimp checks.
- All tools not in regular use shall be similarly checked every 12 months to the gauging requirements.

- All tools not in regular use shall be similarly checked every 12 months to the gauging requirements.

B. Gauging of Tools :
(Ref. Fig. 004)
Each tool or die shall be tested by the insertion of GO/NO GO gauge.

(1) Example:
Gauge part number : M22520/3-1

(2) Procedure:
- A GO-NO GO gauge is used to check condition of crimping tool. When tool handles are squeezed, the GO element must pass through the dies, the NO-GO element must not pass.
- Only one gauge is necessary for periodic in-service inspection of crimping tool, examples:

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TOOLS REQUIRING CERTIFICATION

TOOLS REQUIRING CERTIFICATION

X8U08481 - X0332T0 - XM2004000000001

CALIBRATION - CERTIFICATION OF TOOLS

DETERMINING CERTIFICATION REQUIREMENTS

Theses short intervals are due to the intensity of utilization in a production line.
As you can see we consider, in theory, that every 2000 crimp a check must be done.
After deep investigations, it appears that it is necessary to check every tree month in a production line, but for operators a 1-year interval is considered fully acceptable.
However we recommend making visual check of general aspect of dies before using a crimping tool to ensure no contamination appeared between the 1-year periods.

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- no strands outside the crimping barrel (and/or extending out the inspection hole),
- no cut strands,
- adequate insertion of conductor strands in barrel where it is possible to check without damaging conductor,
- absence of damage to the conductor.

NOTE : It is recommended that each crimp has a gentle manual pull applied in order to establish there is no movement of conductor within the crimp.
Due consideration must however be given to the size of cable under inspection.

4. Periodic Tests

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A. Test Intervals

- Each new tool before use shall be submitted for gauging, where applicable, and specimen checks.
- Each tool shall be submitted for gauging at 1000 and 2000 crimps and only if successful, returned for use. The checking at 3000 crimps shall be by gauging and specimen checks. This procedure shall be followed at subsequent 1000 crimp checks.

B. Gauging of Tools :
(Ref. Fig. 004)
Each tool or die shall be tested by the insertion of GO/NO GO gauge.

(1) Example:
Gauge part number : M22520/3-1

(2) Procedure:
- A GO-NO GO gauge is used to check condition of crimping tool. When tool handles are squeezed, the GO element must pass through the dies, the NO-GO element must not pass.
- Only one gauge is necessary for periodic in-service inspection of crimping tool, examples:

EFF : ALL

20-25-21 Page 6
Apr 01/01

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AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 005 (Sheet 1) / 20-25-21 - Inspection Tool with Gauge GO - NO GO M22520/3-1	

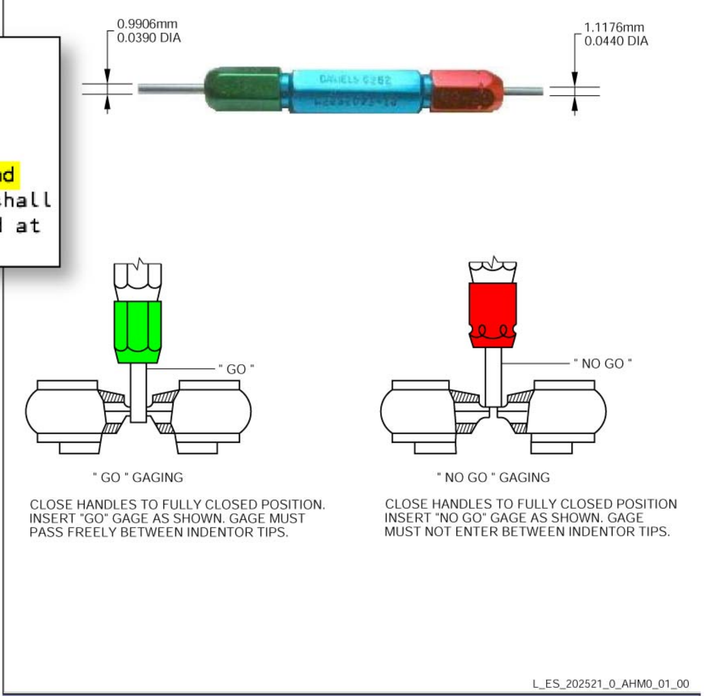

Figure 005 (Sheet 1) -25-21 - Inspection Tool with Gauge - NO GO M2252(-1

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DETERMINING CERTIFICATION REQUIREMENTS

M22520-2-01

M22520-2-0X

DETERMINING CERTIFICATION REQUIREMENTS

DETERMINING CERTIFICATION REQUIREMENTS

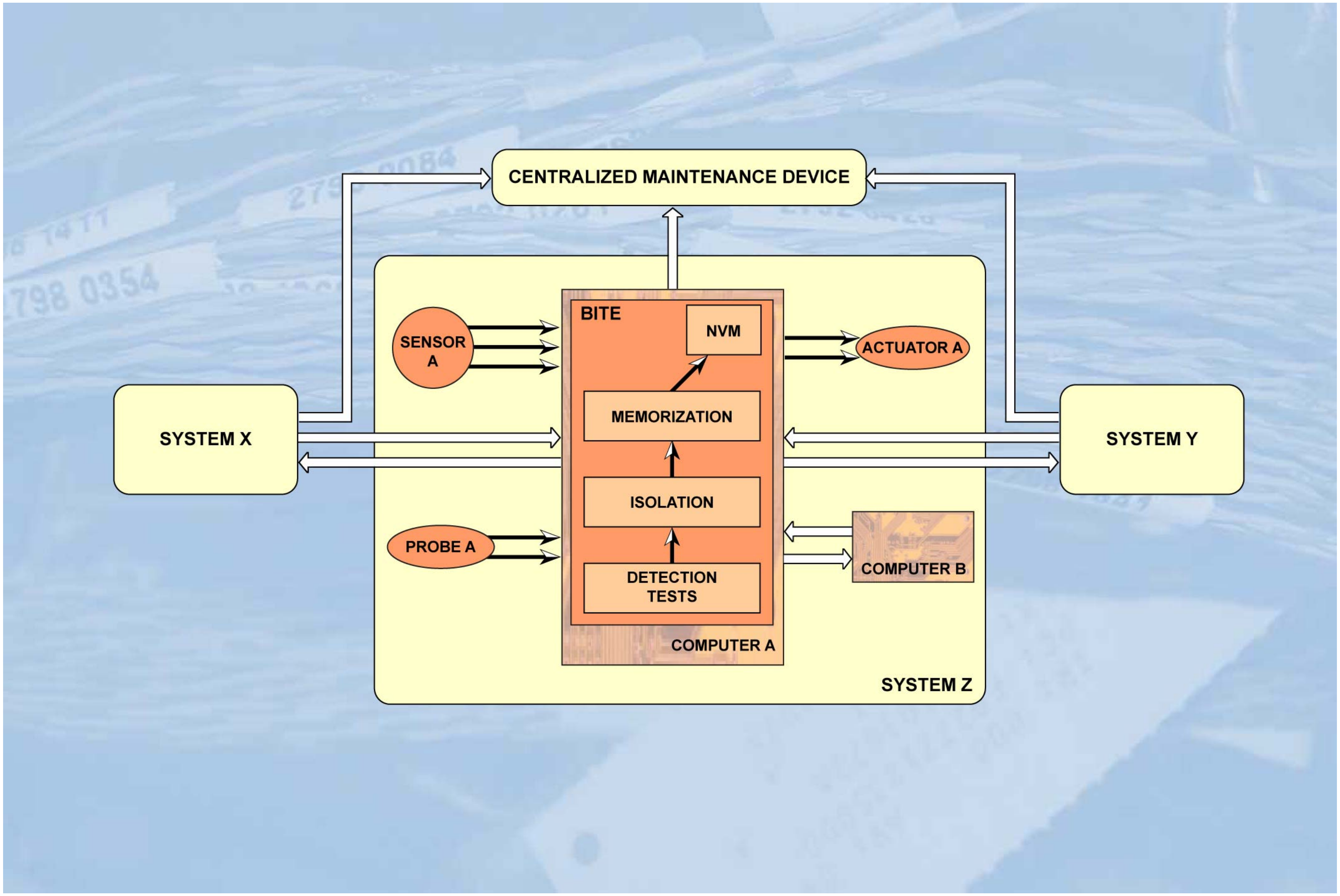
WIRING CHECKS USING TSM, "NFF POLICY"

GENERAL

A system is composed of LRUs which can be: computers, sensors, actuators. Probes, etc.
With the new technology, most of these Line Replaceable Units (LRUs) are controlled by digital computers
For safety reasons, these LRUs are permanently monitored, they can be tested and trouble shooting can be performed.
In each system, a part of a computer is dedicated to these functions: it is called Built-In Test Equipment.
Sometimes, in multi-computer systems, one computer is used to concentrate the BITE (Built-In Test Equipment) data of the system

BITE

During normal operation, the system is permanently monitored: internal monitoring, inputs/outputs monitoring, link monitoring between LRUs within the system.
FAULT DETECTION
If a failure occurs, it can be permanent (consolidated) or intermittent.
ISOLATION
After failure detection, the BITE is able to identify the possible failed LRUs and can give a snapshot of the system environment when the failure occurred.
MEMORIZATION
All the information necessary foe maintenance and trouble shooting is memorized in a Non Volatile Memory

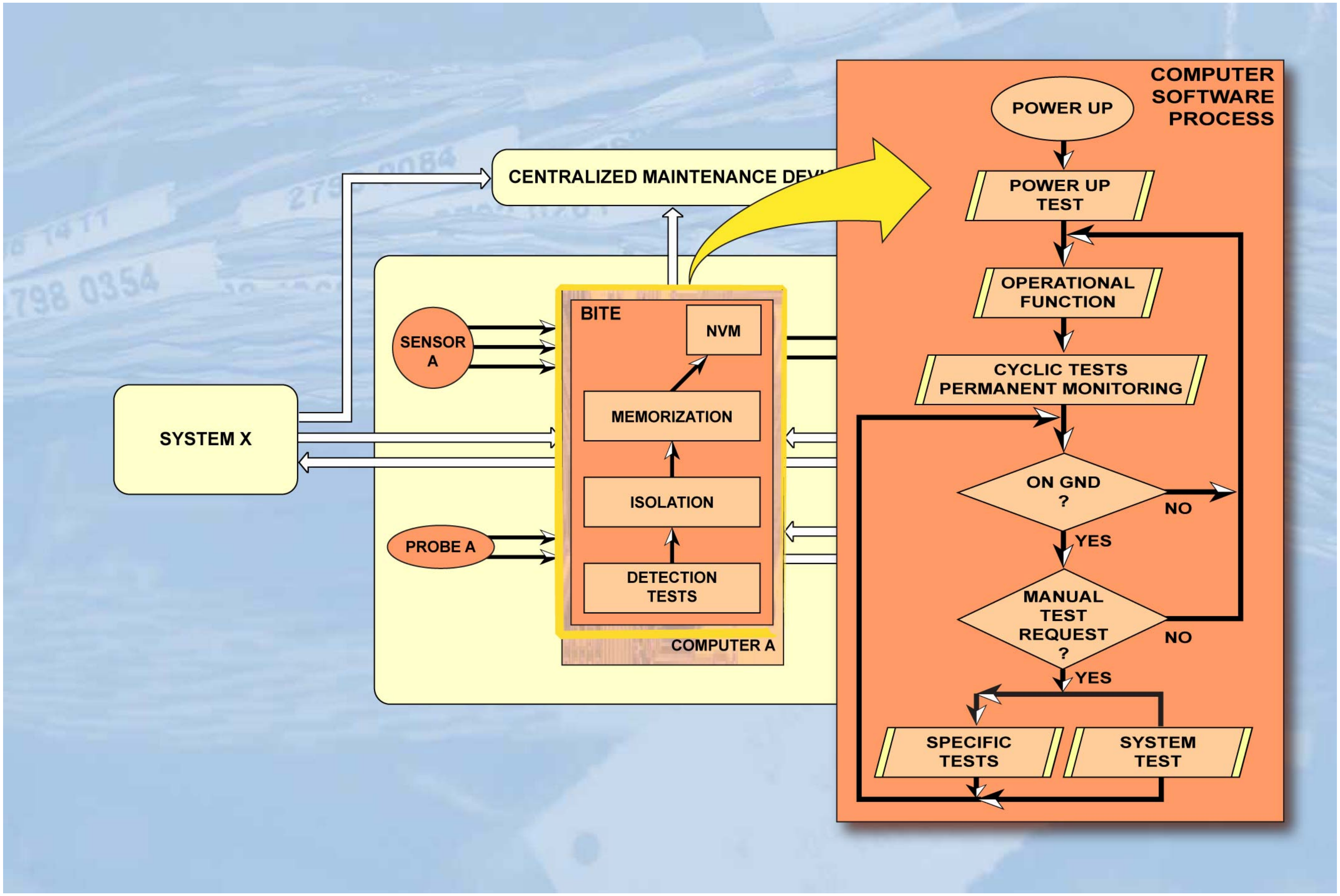


GENERAL & BITE

WIRING CHECKS USING TSM, "NFF POLICY"

TEST

The test function can be divided into 4 groups
POWER UP TEST
The power up test is first a safety test.
The purpose of a safety test is to ensure compliance with safety objectives.
It is executed only on ground after long power cuts (more than 200ms)
Its duration is function of the system that is not operation during the power up test.
If the aircraft is airborne, the power up test is limited to few items to enable a quick return to operation of the system.
The typical tasks of a power up test are: test of microprocessor, test of memories, test of ARINC 429 and various I/O circuits, configuration test.
CYCLIC TESTS
These tests are carried out permanently.
They do not disturb system operation.
The typical tasks of a cyclic test (also called IN OPERATION TEST) are: Watchdog test (a watchdog is a device capable of restarting the microprocessor if the software fails), RAM test, Permanent monitoring is performed by the operational program (e.g.: ARINC 429 message validity).
SYSTEM TEST
The purpose of this test is to offer to the maintenance staff the possibility to test the system for trouble shooting purposes.
This test can be performed after the replacement of an LRU in order to check the integrity of the system or sub-system.
It is similar to the POWER UP TEST but is more complete. It is performed with all peripherals supplied.
SPECIFIC TESTS
For some systems, specific tests are available.
The purpose of these tests is to generate stimuli to various command devices such as actuators or valves
They can have a major effect on the aircraft (automatic moving of the slats or flaps, engine dry cranking).

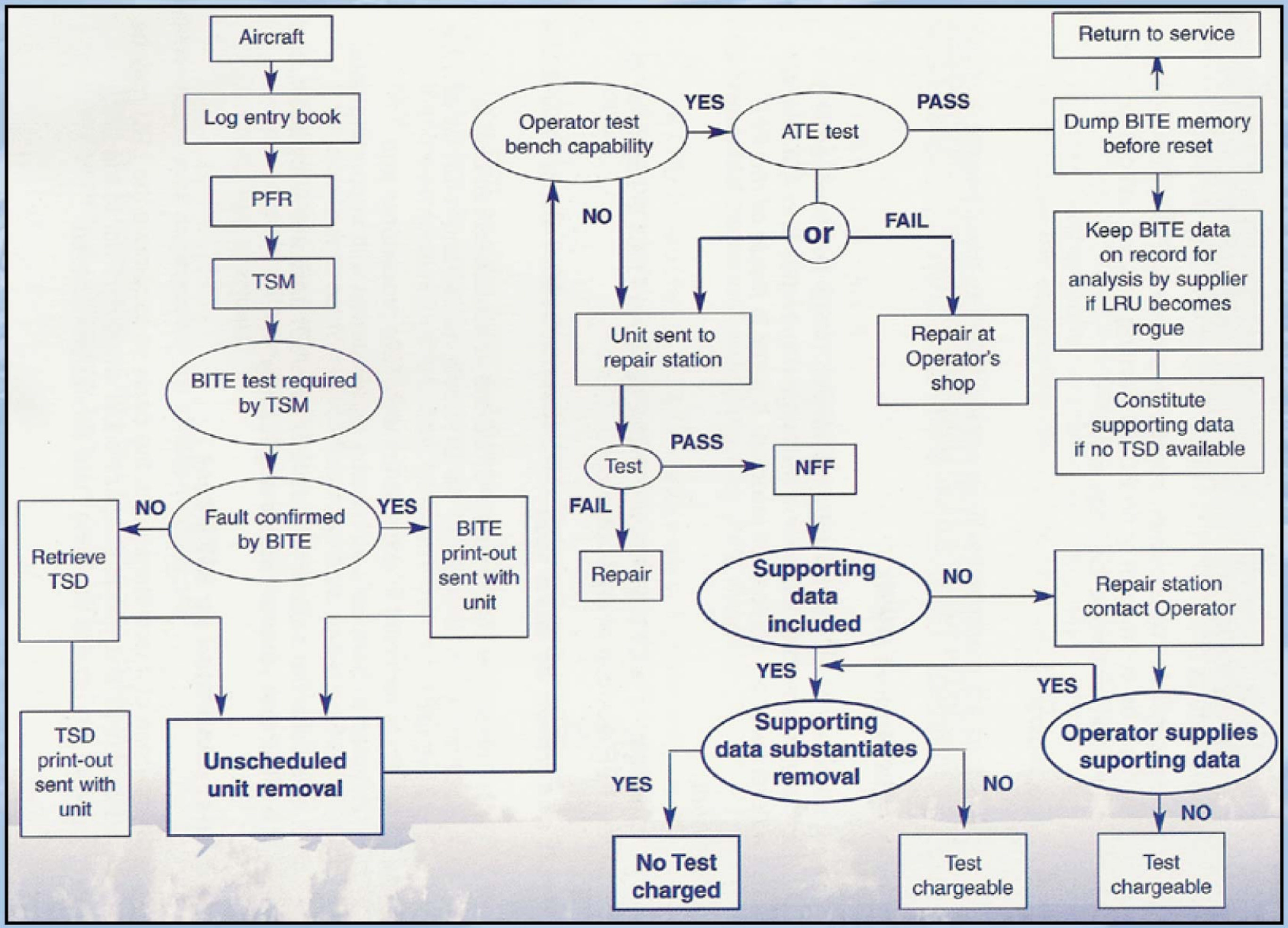

CENTRALIZED MAINTENANCE DEVI
SYSTEM X
SENSOR A
PROBE A
BITE
NVM
MEMORIZATION
ISOLATION
DETECTION TESTS
COMPUTER A
COMPUTER SOFTWARE PROCESS
POWER UP
POWER UP TEST
OPERATIONAL FUNCTION
CYCLIC TESTS PERMANENT MONITORING
ON GND ?
NO
YES
MANUAL TEST REQUEST ?
NO
YES
SPECIFIC TESTS
SYSTEM TEST

TEST

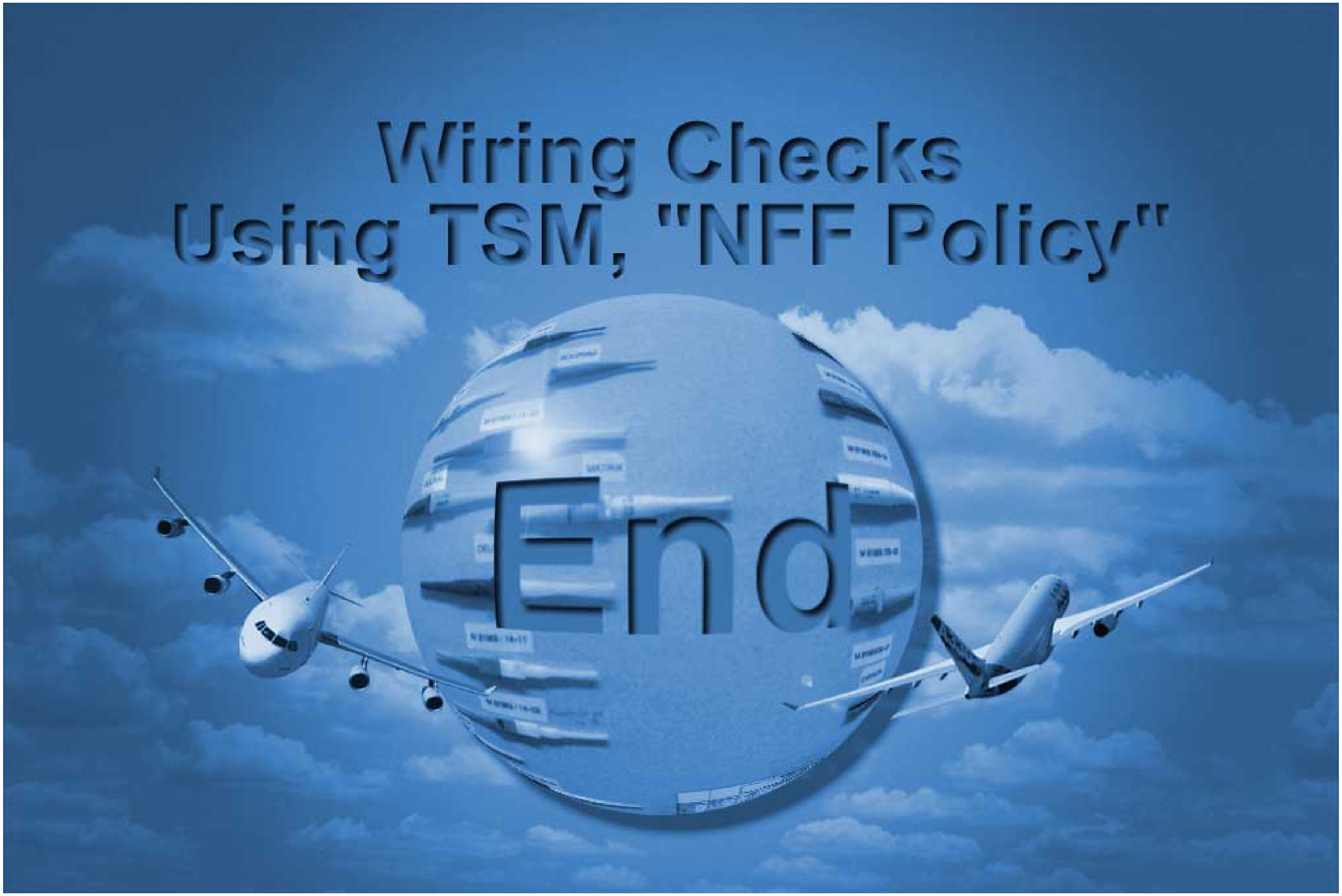
WIRING CHECKS USING TSM, "NFF POLICY"

NEW CONCEPT

The BITE information stored in the system BITE memories is sent to a centralized maintenance device.
The manual tests (SYSTEM TEST and SPECIFIC TESTS) can be initiated via this centralized maintenance device.
Its main advantages are:
- single interface location (cockpit)
- easy fault identification
- reduction of the trouble shooting duration
- simplification of the technical documentation
- standardization of the equipment.


Aircraft
Log entry book
PFR
TSM
BITE test required by TSM
Fault confirmed by BITE
NO
YES
Retrieve TSD
BITE print-out sent with unit
TSD print-out sent with unit
Unscheduled unit removal
Operator test bench capability
YES
NO
ATE test
PASS
FAIL
or
Return to service
Dump BITE memory before reset
Keep BITE data on record for analysis by supplier if LRU becomes rogue
Constitute supporting data if no TSD available
Unit sent to repair station
Repair at Operator's shop
Test
PASS
NFF
FAIL
Repair
Supporting data included
NO
Repair station contact Operator
YES
YES
Supporting data substantiates removal
Operator supplies suporting data
YES
NO
NO
No Test charged
Test chargeable
Test chargeable

NEW CONCEPT



NEW CONCEPT

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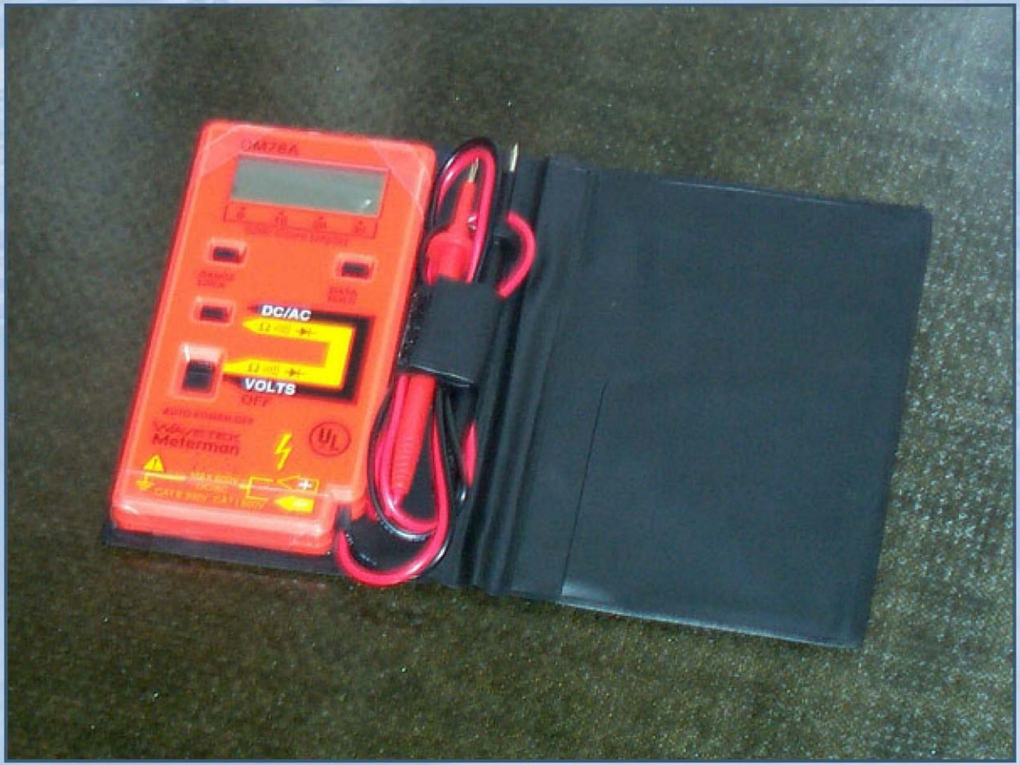
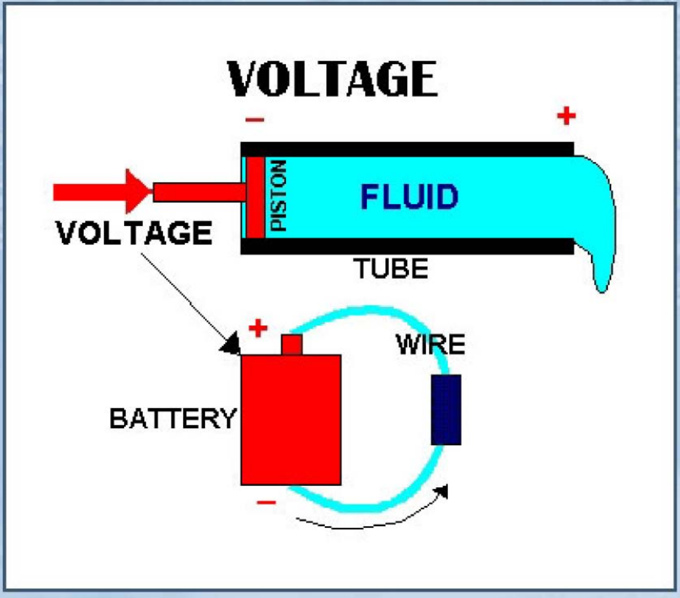
MEASUREMENT AND TROUBLESHOOTING USING METERS

VOLTAGE - CURRENT AND RESISTANCE

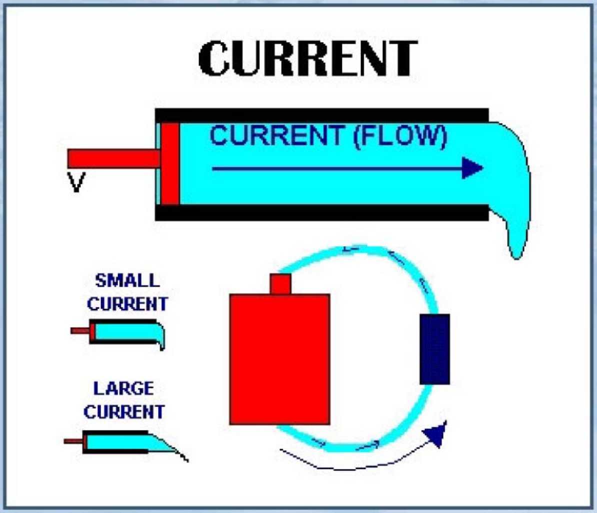
This module will give you the correct use of electrical meters.
First let's remind you some generalities on the electricity.
1 - Voltage.
The voltage is the electrical force (or pressure) that causes current to flow in a close circuit. It is measured in Volts.
In this draw the voltage would be the force that is pushing the water (electrons) forward.
2 - The Current.
The current is the movement of electrical charge. A flow of electrons, through the electronic circuit. Current is measured in Amperes. Current would be the flow of water moving though a tube (wire).
RESISTANCE
As the electrons work their way through the thin metal filament of the lamp, they encounter more opposition to motion than they typically would in a thick piece of wire.
This opposition to electric current depends on the type of material, its cross-sectional area, and its temperature. It is technically know as resistance. We can say that conductors have low resistance and insulators have very high resistance.
When electrons move against the opposition of resistance, "friction" is generated. Just like mechanical friction, the friction produced by electrons flowing against a resistance manifests itself in the form of heat. The concentrated resistance of a lamp's filament results in a relatively large amount of heat dissipated at the filament.
This heat produces light.



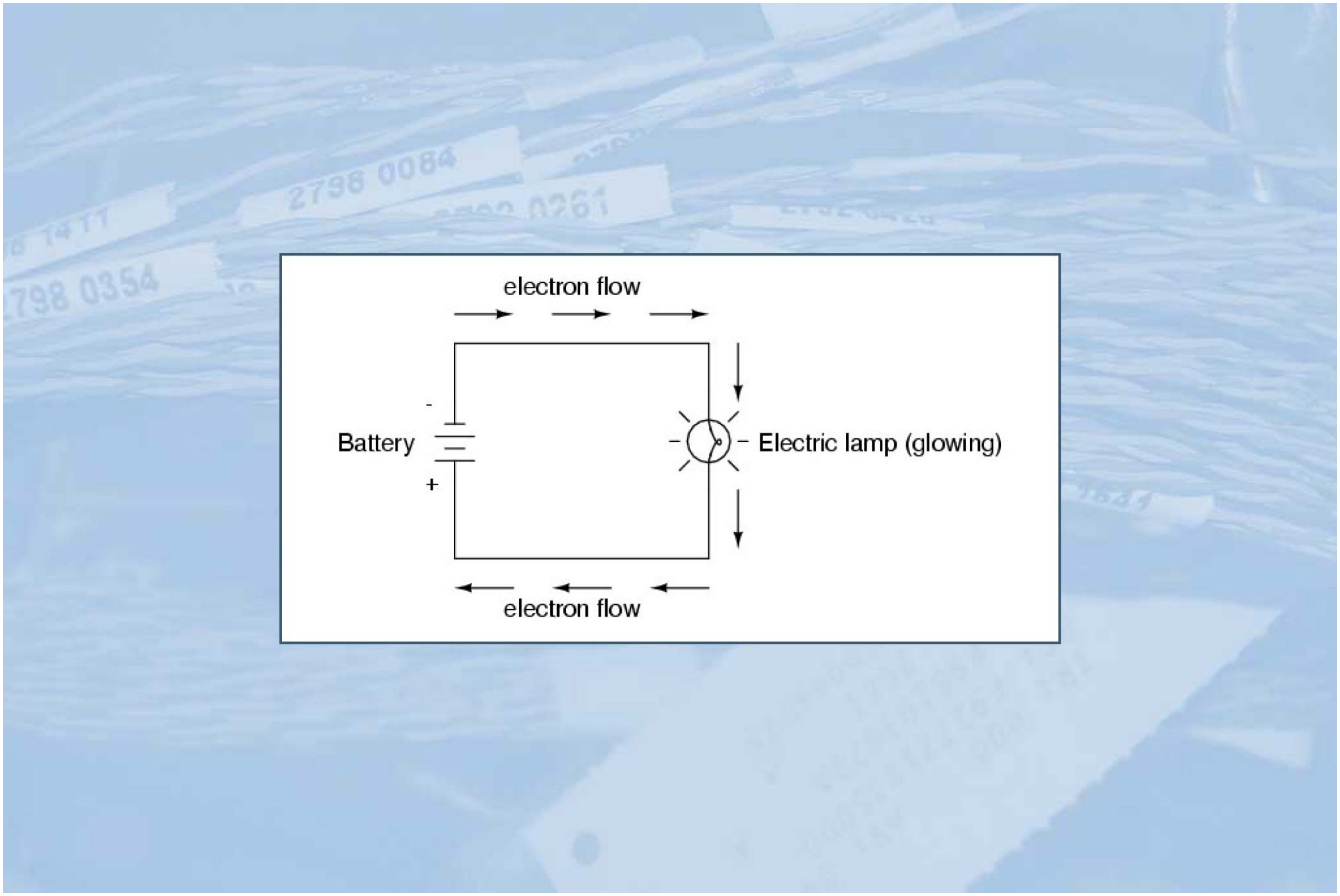
VOLTAGE - CURRENT AND RESISTANCE



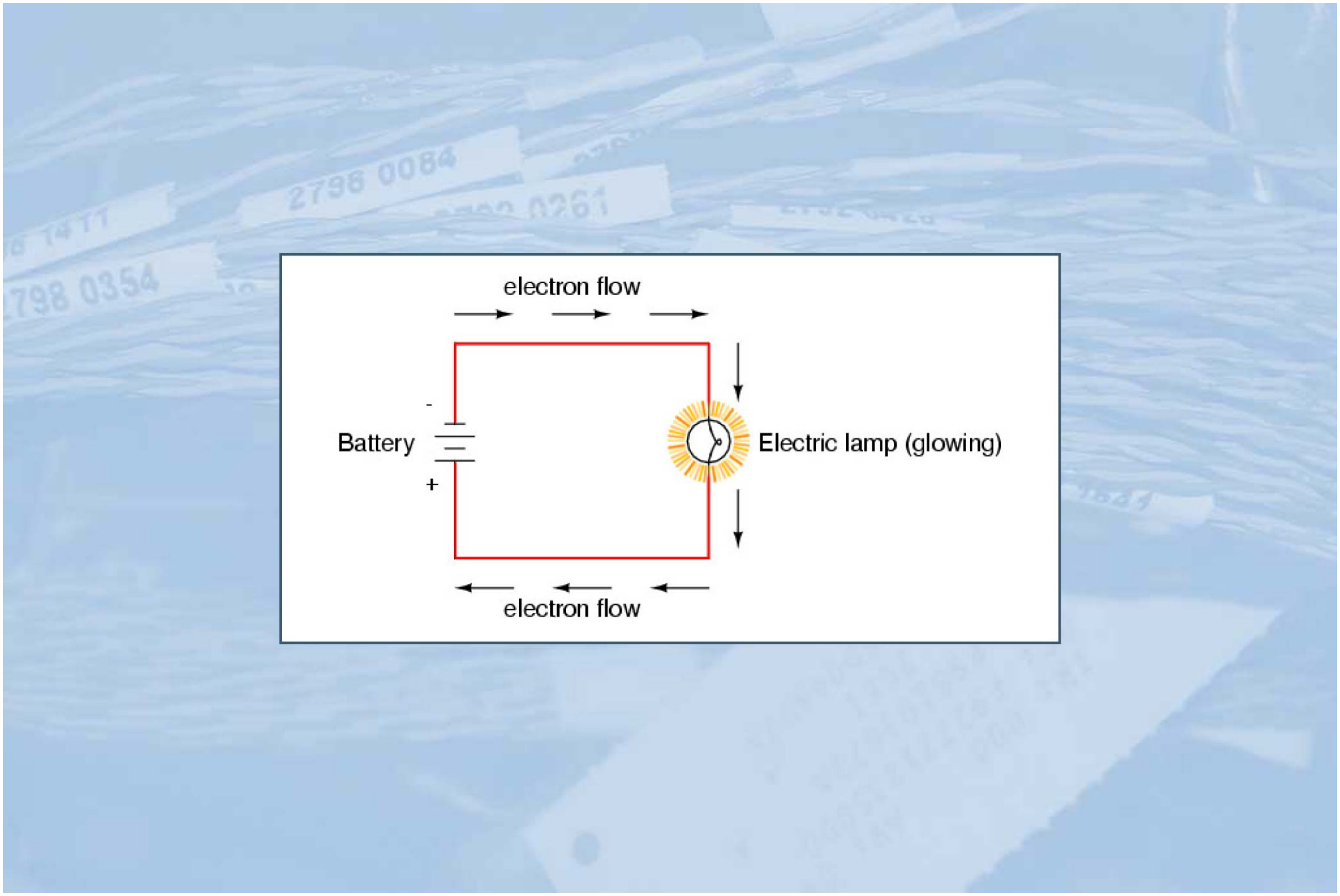
VOLTAGE - CURRENT AND RESISTANCE



VOLTAGE - CURRENT AND RESISTANCE



VOLTAGE - CURRENT AND RESISTANCE

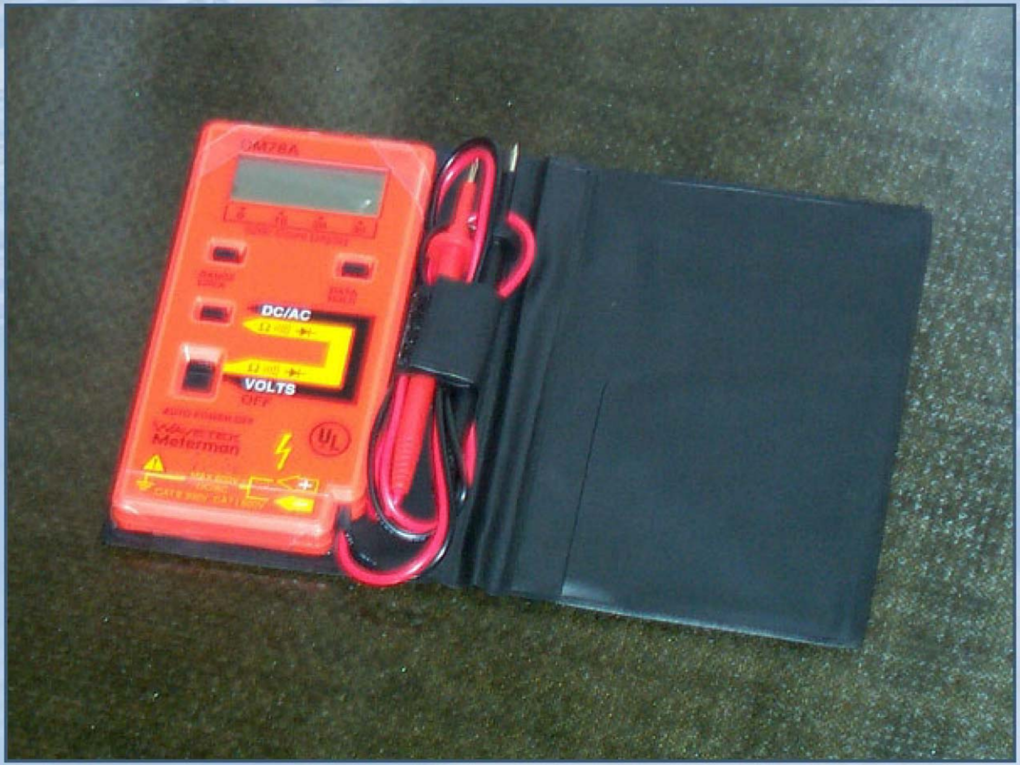


VOLTAGE - CURRENT AND RESISTANCE

MEASUREMENT AND TROUBLESHOOTING USING METERS

CONTINUITY

Now let's have a look on the different test you can perform when you have a fault on the wiring.



CONTINUITY

MEASUREMENT AND TROUBLESHOOTING USING METERS

ELECTRICAL TESTS

ELECTRICAL TESTS
Continuity Test
(ref 20-52-21)
ELECTRICAL TESTS
Short Circuit Test
(ref 20-52-22)
ELECTRICAL TESTS
Insulation Test
(ref 20-52-24)

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

CONTINUITY TESTS - DESCRIPTION AND OPERATION

1. Reason for the Job
R

R **WARNING :** BE CAREFUL WHEN YOU USE ELECTRIC TOOLS IN AREAS WHERE THERE ARE
R RISKS OF EXPLOSION (FUEL TANKS, FUEL VAPOUR AREAS, ETC.). REFER TO

WARNING : BE CAREFUL WHEN YOU USE ELECTRIC TOOLS IN AREAS WHERE THERE ARE RISKS OF EXPLOSION (FUEL TANKS, FUEL VAPOUR AREAS, ETC.). REFER TO YOUR LOCAL REGULATIONS AND MAKE SURE THAT YOU OBEY THEM. SOME ELECTRIC TOOLS SUCH AS HEAT GUNS, SOLDERING IRONS AND TOOLS WITHOUT INTRINSIC PROTECTION ARE NOT PERMITTED IN THESE AREAS.

A. Fixture, Tools, Test and Support Equipment

REFERENCE	QTY	DESIGNATION
No Specific		Milliohmmeter

NOTE : For a continuity test in the fuel tanks, use an intrinsic safety milliohmmeter (For example: Milliohmmeter CULTON type 278, AVTRON T477W or equivalent)

3. Job Set-Up
(Ref. Fig. 001)

A. Milliohmmeter Check
Before you start the continuity test:

(1) Make sure that the milliohmmeter operates correctly.
Make sure that the extension wires (if used) are in the correct condition.
(Ref. Fig. 001)

(2) Adjust the milliohmmeter to show zero Ohm with the two probes in contact.

EFF : ALL

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Jan 01/03

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AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-52-21 - Continuity Test - Ohmmeter Check	

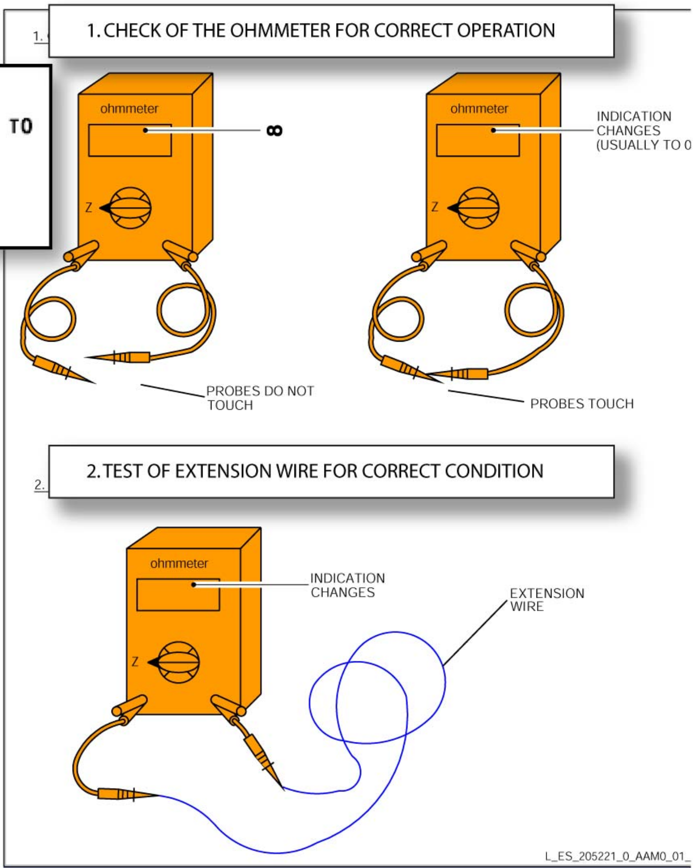

Figure 001 (Sheet 1) / 20-52-21 - Continuity Test - Ohmmeter Check

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ELECTRICAL TESTS

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ELECTRICAL STANDARD PRACTICES MANUAL

B. Voltage and Current Values for the Test.
Use these voltage values:

(1) For circuits with conductors connected directly via standard electrical connections (connectors, modules, etc ...):
- 0.1 A less than or equal to I less than or equal to 2 A with U = 28 VDC max.

(2) For circuits with conductors connected via standard electrical

CAUTION : DO NOT CAUSE DAMAGE TO CONNECTOR CONTACTS WHEN YOU DO CONTINUITY CHECKS. DAMAGED CONTACTS CAN BECOME LOOSE AND CAN THUS INTERMITTENTLY PREVENT CORRECT CONTINUITY.

CAUTION : BE CAREFUL NOT TO CAUSE DAMAGE TO THE WIRE INSULATION. IF THERE IS DAMAGE TO THE INSULATION, MOISTURE CAN GO INTO THE WIRE AND CAUSE CORROSION AND SUBSEQUENT FAILURE OF THE WIRE.

R CAUTION : BE CAREFUL NOT TO CAUSE DAMAGE TO THE WIRE INSULATION. IF THERE IS
R DAMAGE TO THE INSULATION, MOISTURE CAN GO INTO THE WIRE AND CAUSE
R CORROSION AND SUBSEQUENT FAILURE OF THE WIRE.

R

A. Test of the Continuity of an Aircraft Wire
There are two methods for this test:

(1) Continuity test with aircraft wire connected to a grounding point (Ref. Fig. 002)

(a) Disconnect the aircraft wire at the two ends.

(b) Connect one end of the aircraft wire to a grounding point.

(c) Connect one of the milliohmmeter probes to the other end of the wire.

(d) Connect the second milliohmmeter probe to a grounding point.

EFF : ALL	20-52-21	Page 3 Jan 01/03

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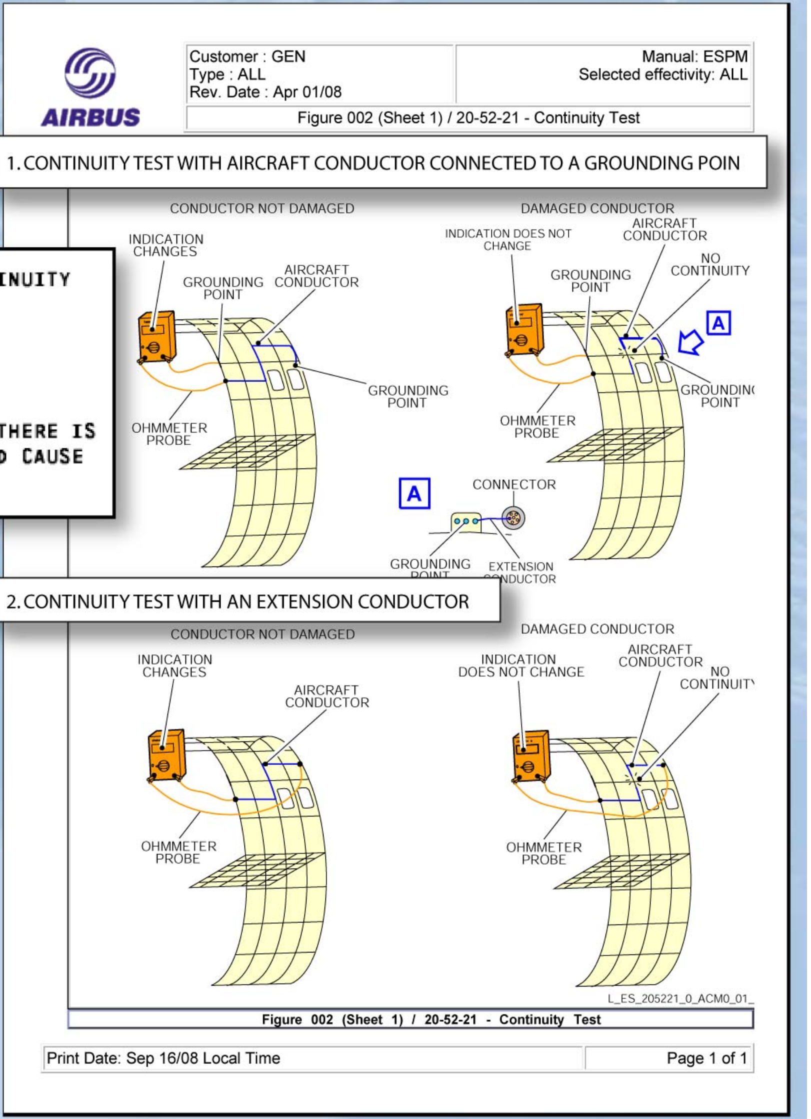

ELECTRICAL TESTS

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

(e) Make sure that the current flows through the conductor (the indication on the ohmmeter changes).

<u>NOTE</u> : The resistance value of the wire is shown. For calculation of the normal resistance value, refer to the Standard Manual (resistance per metre).

<u>NOTE</u> : We recommend that you do a short circuit detection test after this procedure. This is to make sure that there is no short-circuit to the structure before a possible continuity defect.

(2) Continuity test with an extension wire:

(a) Disconnect the aircraft wire at the two ends.

(b) Connect the extension wire to one end of the aircraf wire.

(c) Connect the extension wire to one probe of the milliohmmeter.

(d) Connect the second milliommeter probe to the second end of the aircraft wire.

(e) Make sure that the current flows through the conductor (the indication on the ohmmeter changes).

<u>NOTE</u> : The resistance value of the wire is shown. For calculation of the normal resistance value, refer to the Standard Manual (resistance per metre).

<u>NOTE</u> : We recommend you that you do an insulation test after this procedure.

EFF : ALL

R

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ELECTRICAL TESTS

X8U08481 - X0332T0 - XM2006000000001

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ELECTRICAL STANDARD PRACTICES MANUAL

TEST FOR SHORT CIRCUIT - DESCRIPTION AND OPERATION

1. Reason for the Job

R **WARNING :** BE CAREFUL WHEN YOU USE ELECTRIC TOOLS IN AREAS WHERE THERE ARE
R RISKS OF EXPLOSION (FUEL TANKS, FUEL VAPOUR AREAS, ETC.). REFER TO
R YOUR LOCAL REGULATIONS AND MAKE SURE THAT YOU OBEY THEM. SOME
R ELECTRIC TOOLS SUCH AS HEAT GUNS, SOLDERING IRONS AND TOOLS

WARNING : BE CAREFUL WHEN YOU USE ELECTRIC TOOLS IN AREAS WHERE THERE ARE RISKS OF EXPLOSION (FUEL TANKS, FUEL VAPOUR AREAS, ETC.). REFER TO YOUR LOCAL REGULATIONS AND MAKE SURE THAT YOU OBEY THEM. SOME ELECTRIC TOOLS SUCH AS HEAT GUNS, SOLDERING IRONS AND TOOLS WITHOUT INTRINSIC PROTECTION ARE NOT PERMITTED IN THESE AREAS.

A. Fixture, Tools, Test and Support Equipment

REFERENCE	QTY DESIGNATION
No Specific	Milliohmmeter

NOTE : For a test for a short circuit in the fuel tanks, use an intrinsic safety milliohmmeter (For example: Milliohmmeter CULTON type 278, AVTRON T477W or equivalent)

3. Job Set-Up

A. Milliohmmeter Check

(1) Before you start the test for a short circuit , make sure that the milliohmmeter operates correctly.
(Ref. Fig. 001)

(2) With the two probes in contact adjust the milliohmmeter to show zero Ohm.

B. Voltage and Current Values for the Test.
Use these voltage values:

(1) For circuits with conductors connected directly via standard electrical connections (connectors, modules, etc ...):
- 0.1 A less than or equal to I less than or equal to 2 A with U = 28 VDC max

EFF : ALL

20-52-22 Page 1
Jan 01/03

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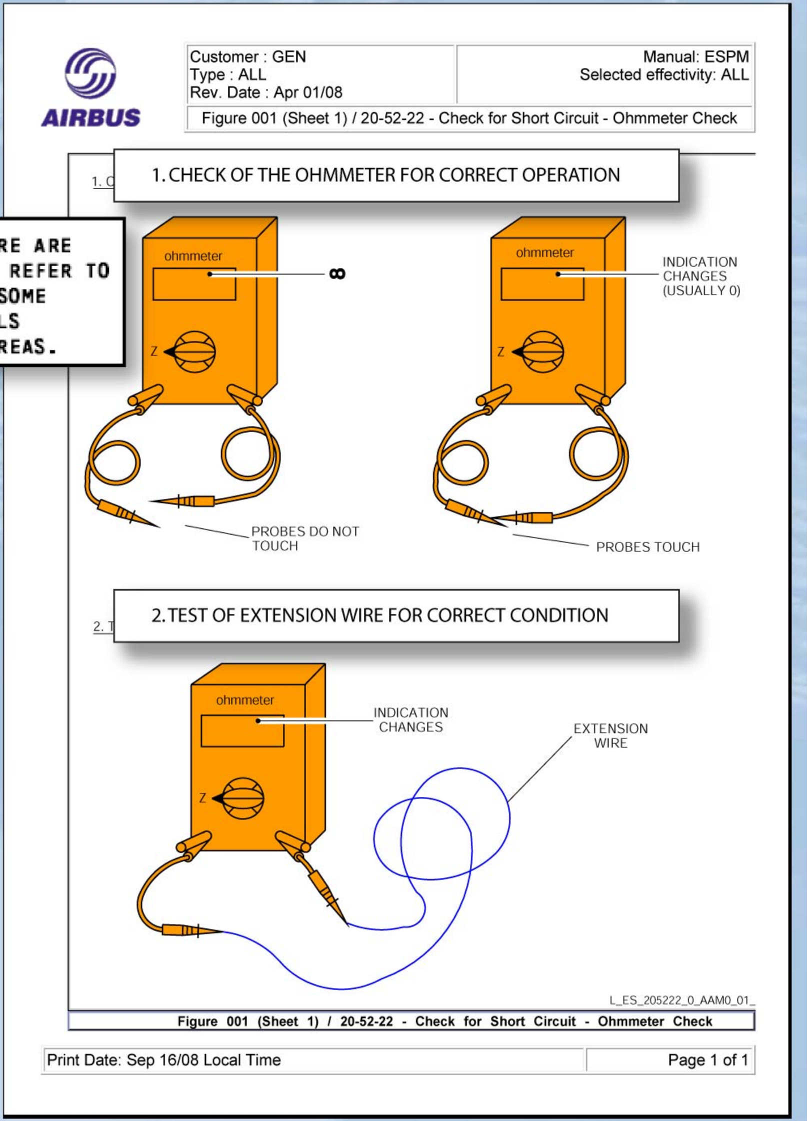

ELECTRICAL TESTS

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

(2) For circuits with conductors connected via standard electrical control components (switches, pushbuttons, etc...):
- in static mode (without operation of the control components) I less than or equal to 0.5 A with U = 10 VDC max.
- in dynamic mode (with operation of the control components) P less then or equal to 100 mVA with U = 10 VDC max.

4. Procedure
(Ref. Fig. 002)

CAUTION : DO NOT CAUSE DAMAGE TO CONNECTOR CONTACTS WHEN YOU DO CONTINUITY CHECKS. DAMAGED CONTACTS CAN BECOME LOOSE AND CAN THUS INTERMITTENTLY PREVENT CORRECT CONTINUITY.

CAUTION : BE CAREFUL NOT TO CAUSE DAMAGE TO THE WIRE INSULATION. IF THERE IS DAMAGE TO THE INSULATION, MOISTURE CAN GO INTO THE WIRE AND CAUSE CORROSION AND SUBSEQUENT FAILURE OF THE WIRE.

(a) Connect one of the milliohmmeter probes to one end of the aircraft wire.

(b) Connect the second milliohmmeter probe to a grounding point.

(c) Make sure that the current does not flow from the conductor to the structure (the indication on the milliohmmeter does not change).

(2) Test between two wires:

(a) Connect one of the milliohmmeter probes to the wire to be tested.

(b) Connect the second milliommeter probe to other wire of the connector.

(c) Make sure that the current does not flow through the conductors (the indication on the milliohmmeter does not change).

EFF : ALL

20-52-22 Page 3 Jan 01/03

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AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-52-22 - Check for Short-Circuit	

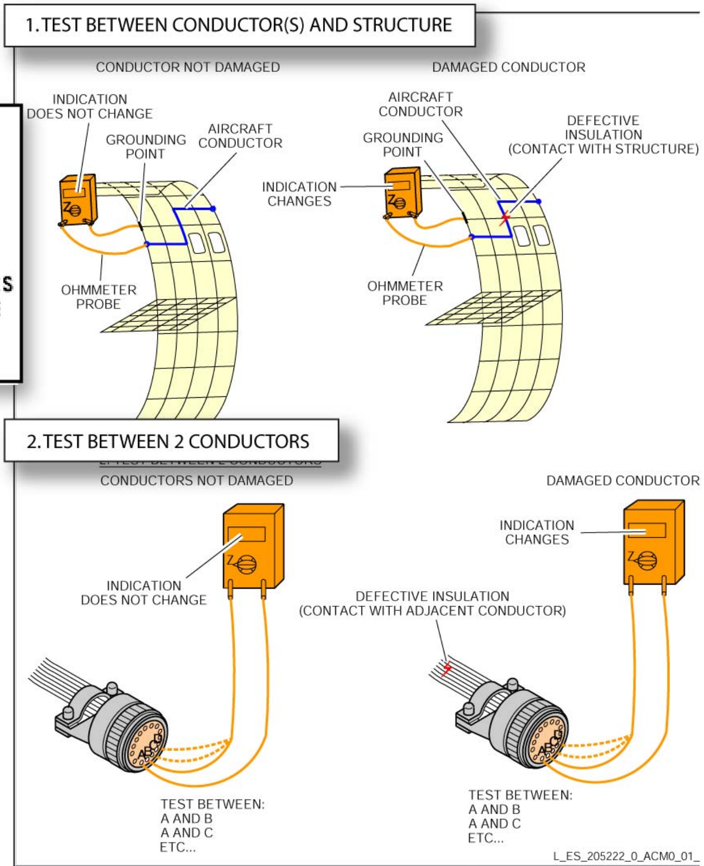

Figure 002 (Sheet 1) / 20-52-22 - Check for Short-Circuit

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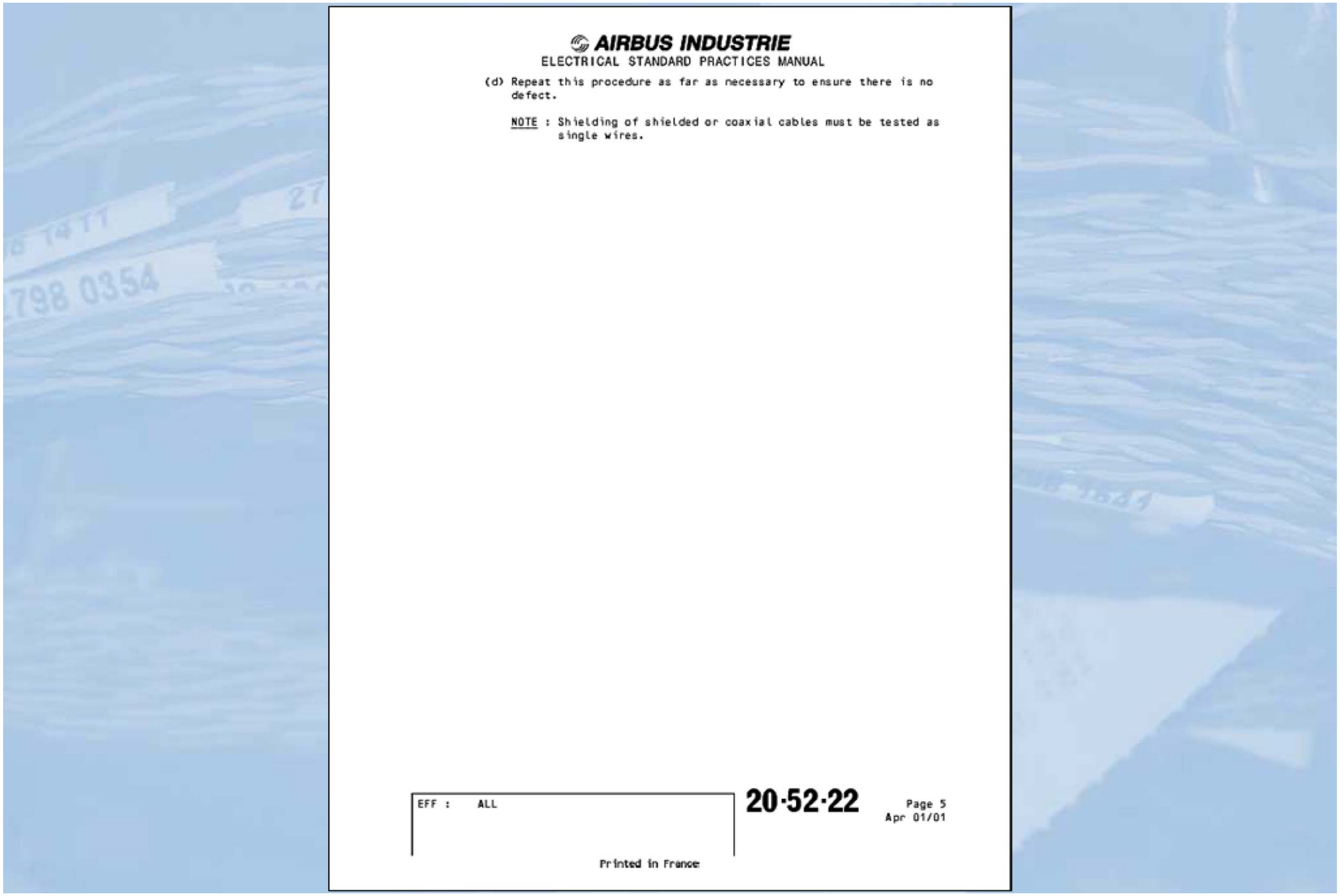
ELECTRICAL TESTS

X8U08481 - X0332T0 - XM2006000000001



AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

(d) Repeat this procedure as far as necessary to ensure there is no defect.

NOTE : Shielding of shielded or coaxial cables must be tested as single wires.

EFF : ALL

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ELECTRICAL TESTS

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
INSULATION TEST - DESCRIPTION AND OPERATION

WARNING : BE CAREFUL WHEN YOU USE ELECTRIC TOOLS IN AREAS WHERE THERE ARE RISKS OF EXPLOSION (FUEL TANKS, FUEL VAPOUR AREAS, ETC.). REFER TO YOUR LOCAL REGULATIONS AND MAKE SURE THAT YOU OBEY THEM. SOME ELECTRIC TOOLS SUCH AS HEAT GUNS, SOLDERING IRONS AND TOOLS WITHOUT INTRINSIC PROTECTION ARE NOT PERMITTED IN THESE AREAS.

CAUTION : ONLY DO THIS TEST FOR THE ELECTRICAL ITEMS SPECIFIED IN THIS PROCEDURE. YOU CAN CAUSE DAMAGE IF YOU DO THIS PROCEDURE FOR OTHER ITEMS.

- Battery feeders,
- Transformer rectifier feeders,
- APU starter wires.
- Fuel pump supply cables.

2. Job Set-Up Information

A. Fixture, Tools, Test, and Support Equipment

REFERENCE	QTY DESIGNATION
No Specific	Megohmmeter 500V

NOTE : We recommend that you use an EURELAP type M[...] equivalent. Refer to the manufacturers inst[...] the test.

3. Job Set-Up

A. Preparation
- Connect the aircraft structure to the ground,
- Disconnect the lightning protection unit (LPU),
- Disconnect the wire, cable or feeder at each end[...]

EFF : ALL

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ELECTRICAL STANDARD PRACTICES MANUAL

4. Procedure

DO NOT CAUSE DAMAGE TO CONNECTOR CONTACTS WHEN YOU DO CONTINUITY CHECKS. DAMAGED CONTACTS CAN BECOME LOOSE AND CAN THUS INTERMITTENTLY PREVENT CORRECT CONTINUITY.

MAKE SURE THAT THE WIRE IS DISCONNECTED AT EACH END BEFORE YOU DO THIS TEST.
IF THE WIRE IS NOT DISCONNECTED, THE VOLTAGE USED FOR THIS TEST CAN CAUSE DAMAGE TO EQUIPMENT.

BE CAREFUL NOT TO CAUSE DAMAGE TO THE WIRE INSULATION. IF THERE IS DAMAGE TO THE INSULATION, MOISTURE CAN GO INTO THE WIRE AND CAUSE CORROSION AND SUBSEQUENT FAILURE OF THE WIRE.

CAUTION : DO NOT CAUSE DAMAGE TO CONNECTOR CONTACTS WHEN YOU DO CONTINUITY CHECKS. DAMAGED CONTACTS CAN BECOME LOOSE AND CAN THUS INTERMITTENTLY PREVENT CORRECT CONTINUITY.

CAUTION : MAKE SURE THAT THE WIRE IS DISCONNECTED AT EACH END BEFORE YOU DO THIS TEST.
IF THE WIRE IS NOT DISCONNECTED, THE VOLTAGE USED FOR THIS TEST CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION : BE CAREFUL NOT TO CAUSE DAMAGE TO THE WIRE INSULATION. IF THERE IS DAMAGE TO THE INSULATION, MOISTURE CAN GO INTO THE WIRE AND CAUSE CORROSION AND SUBSEQUENT FAILURE OF THE WIRE.

EFF : ALL

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ELECTRICAL TESTS

X8U08481 - X0332T0 - XM2006000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-52-24 - Insulation Test	

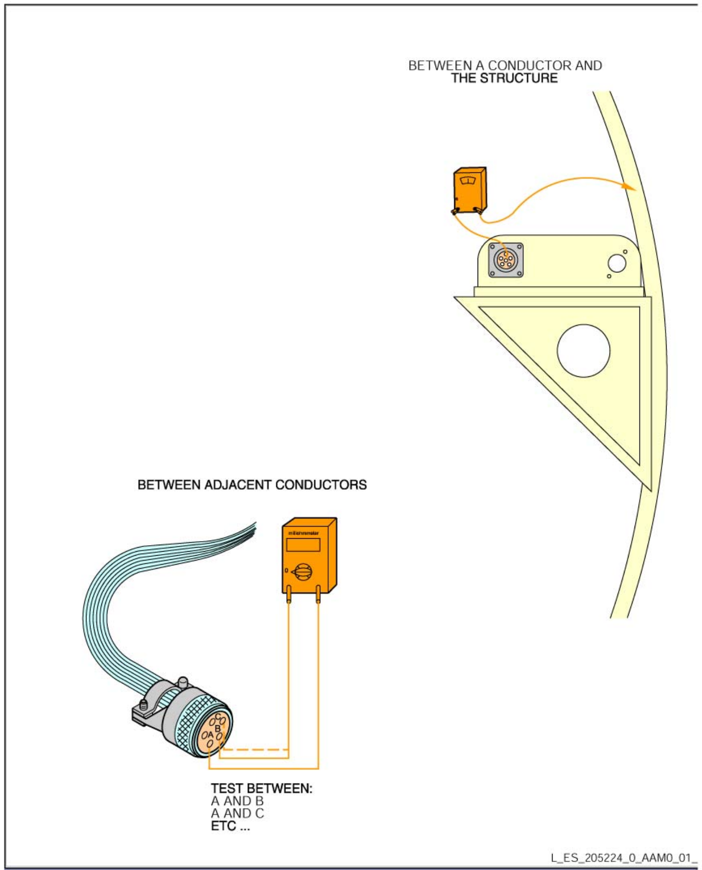

Figure 001 (Sheet 1) / 20-52-24 - Insulation Test

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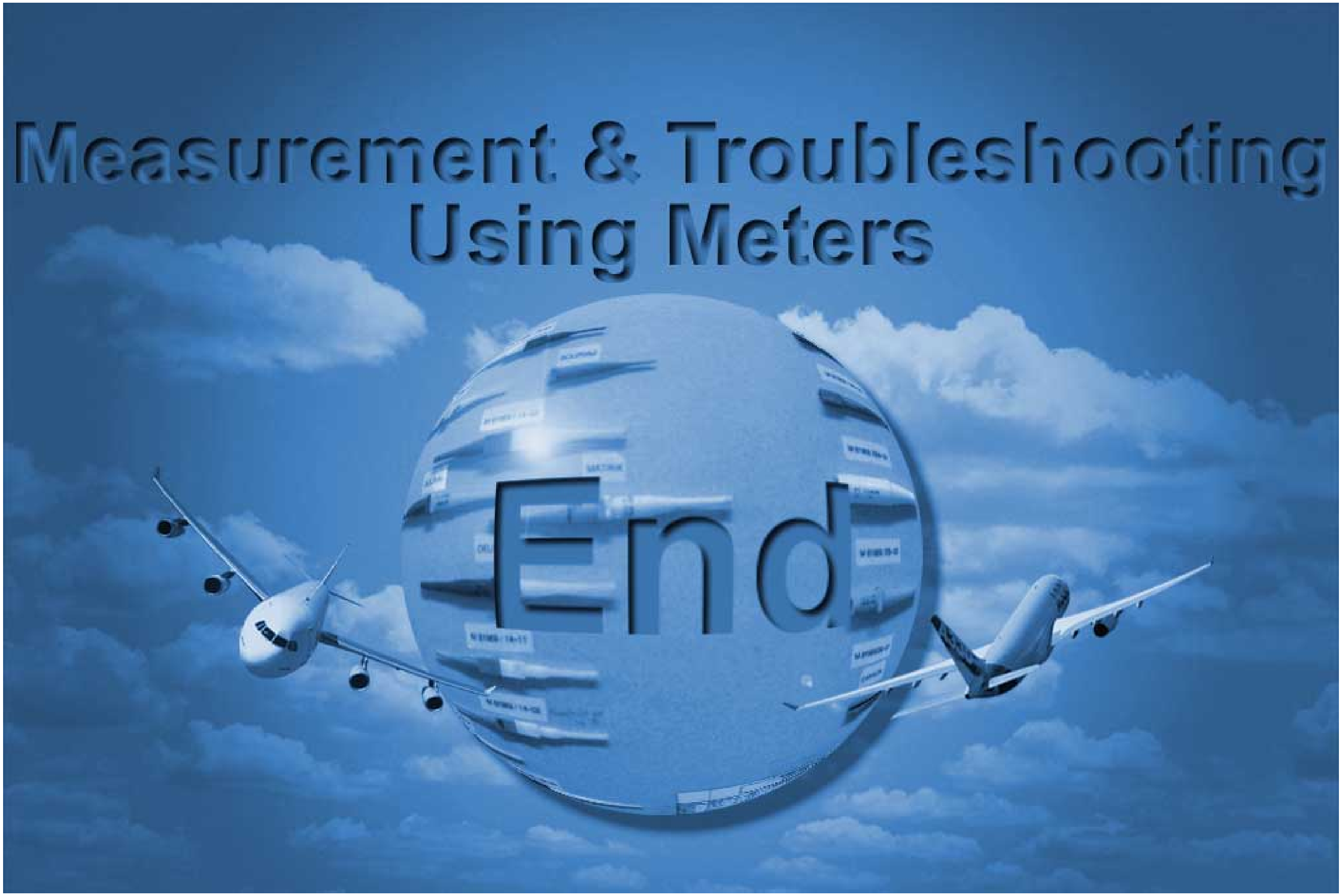
ELECTRICAL TESTS

X8U08481 - X0332T0 - XM2006000000001



ELECTRICAL TESTS

LRU REMOVAL AND REPLACEMENT TECHNIQUES

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT

Required Aircraft Equipment

A319/A320/A321 CAT II/CAT III

Required Aircraft Equipment

A319/320/321 MASTER MINIMUM EQUIPMENT LIST	MASTER MINIMUM EQUIPMENT LIST	01-00	P 7
	MMEL PRESENTATION	SEQ	REV

CAT2, CAT3 SINGLE, CAT3 DUAL AUTOMATIC APPROACH AND LANDING

- Required equipment are listed in AFM 4.03.00 page 8, and FCOM 4.05.70.
- Equipment to be operative to get CAT2, CAT3 SINGLE, or CAT3 DUAL capability displayed on FMAs are also listed in FCOM 4.05.70.

The MMEL does not include these requirements, refer to AFM, and FCOM.

REDUCED VERTICAL SEPARATION MINIMUM (RVSM)

Minimum equipment/functions required to begin RVSM operations are listed in AFM
R 4.03.00 page 12 and FCOM 2.04.50 page 1.
The MMEL does not include these requirements, refer to AFM and FCOM.

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - REQUIRED AIRCRAFT EQUIPMENT

X8U08481 - X0332T0 - XM2007000000001

A319/A320/A321 CAT II/CAT III

Required Aircraft Equipment (cont'd)

A319/320/321 FLIGHT MANUAL	NORMAL PROCEDURES SYSTEMS	4.03.00 P 08 REF

B. MINIMUM EQUIPMENT REQUIRED FOR CAT II AND CAT III APPROACH AND LANDING

REQUIRED EQUIPMENT	CAT II	CAT III SINGLE	CAT III DUAL
AP/FD	1 AP engaged	1 AP engaged	2 AP engaged
AP disconnect P/B	2	2	2
AUTOTHRUST	0	1	1
ILS RECEIVER	2	2	2
ATTITUDE INDICATION	N° 1 + N° 2 + STBY	N° 1 +N° 2 +STBY	N° 1 +N° 2 +STBY
PFD/ND CRT'S	2/1	2/2	2/2
RADIO ALTIMETER	1 (But two displays)	2	2
AUTO CALL OUT RADIO ALTIMETER	0***	1	1
DH INDICATION	1*	1*	1*
FLIGHT WARNING COMPUTER	1	1	2
"AP OFF" warning	1	1	2
"AUTOLAND" light	1	1	1
RAIN REPELLENT (if activated)	[illegible]	[illegible]	[illegible]

* One unit required for the PNF
** One unit required for PF
*** One is required for autoland
**** Required only for autoland with crosswind higher than 12 kt.

R *Note :* *Compliance with CAT II approach and landing criteria has been demonstrated with CAT II and CAT III performance quality ILS beam only.*

R *Compliance with CAT III approach and landing criteria has been demonstrated with CAT II and CAT III performance quality ILS beam only.*

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - REQUIRED AIRCRAFT EQUIPMENT

X8U08481 - X0332T0 - XM2007000000001

A319/A320/A321 CAT II/CAT III

Required Aircraft Equipment (cont'd)

A319/320/321 FLIGHT MANUAL	NORMAL PROCEDURES SYSTEMS	4.03.00 P 08 REF

B. MINIMUM EQUIPMENT REQUIRED FOR CAT II AND CAT III APPROACH AND LANDING

	REQUIRED EQUIPMENT	CAT II	CAT III SINGLE	CAT III DUAL
	RAIN REPELLENT (if activated) or WINDSHIELD WIPERS	1**	1**	1**
	WINDOW HEAT	1**	1**	1**
	NOSEWHEEL STEERING	0	0	1
	ANTI-SKID	0	1	1
R	BSCU channel	0	1	1
	BEAM EXCESSIVE DEVIATION	1*	2	2
	FMA	1	2	2
	"A/THR OFF" caution	0	1	1
	RUDDER TRAVEL LIMIT	1****	1****	1****
	YAW - DAMPER/RUDDER TRIM	1/1	1/1	2/2
	ELAC	1	1	2
	ADR/IR	2/2	2/2	3/3

* One unit required for the PNF
** One unit required for PF
*** One is required for autoland
**** Required only for autoland with crosswind higher than 12 kt.

R *Note : Compliance with CAT II approach and landing criteria has been demonstrated with CAT II and CAT III performance quality ILS beam only.*

R *Compliance with CAT III approach and landing criteria has been demonstrated with CAT II and CAT III performance quality ILS beam only.*

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - REQUIRED AIRCRAFT EQUIPMENT

A319/A320/A321 CAT II/CAT III

Required Aircraft Equipment (cont'd)

A319/320/321 FLIGHT CREW OPERATING MANUAL	FLIGHT PHASE RELATED PROCEDURES	4.05.70	P 14
	APPROACH	SEQ	REV

LANDING CATEGORIES

Each FMGC computes its own landing category : CAT1, CAT2, CAT3 single, and CAT3 dual and displays the corresponding landing category on the FMAs.
Each category depends upon the availability of aircraft systems and functions.
When the landing category downgrades, a triple clic aural warning is activated.

FAIL-OPERATIONAL AUTOMATIC LANDING SYSTEM

An automatic landing system is fail-operational if, in the event of a failure below alert height, the remaining part of the automatic system allows the aircraft to complete the approach, flare and landing. A CAT 3 DUAL system is a fail-operational automatic landing system.

Note : *In the event of a failure, the automatic landing system operates as a fail-passive system.*

FAIL-PASSIVE AUTOMATIC LANDING SYSTEM

An automatic landing system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude, but the landing is not completed automatically. A CAT3 single system is a fail-passive automatic landing system.

Note : *With a fail-passive automatic landing system the pilot assumes control of the aircraft after a failure.*

Below 100 feet (radio altimeter), the FMGS freezes the landing capability until LAND mode is disengaged or both APs are off.
Therefore a failure occuring below 100 feet does not change the category of the system.

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - REQUIRED AIRCRAFT EQUIPMENT

X8U08481 - X0332T0 - XM2007000000001

A319/A320/A321 CAT II/CAT III

Required Aircraft Equipment (cont'd)

A319/320/321 FLIGHT CREW OPERATING MANUAL	FLIGHT PHASE RELATED PROCEDURES	4.05.70	P 15
	APPROACH	SEQ	REV

Table of equipment required for CAT2 and CAT3 approach and landing :

R

	CAPABILITY → / EQUIPMENT ↓	CAT 2	CAT 3 SINGLE	CAT 3 DUAL
FMGS	AP/FD	1 AP ENGAGED	1 AP ENGAGED	2 AP ENGAGED
	AUTOTHRUST	0	1	1
	FMA	1	2	2
	A/THR CAUTION	0	1	1
	FAC	1	1	2
	ELECTRICAL POWER SUPPLY SPLIT	0	0	1
MONITORED	ELAC	1	1	2
	YAW DAMPER/RUDDER TRIM	1/1	1/1	2/2
	PFD DUs	2	2	2
	FLIGHT WARNING COMPUTER	1	1	2
	BSCU CHANNELS	0	1	1
	RADIO ALTIMETERS	1 (displayed on both sides)	2	2
	DH INDICATION	1*	1*	1*
	ILS RECEIVER	2	2	2
	BEAM EXCESSIVE DEVIATION WARNING	1*	2	2
	ATTITUDE INDICATION (PFD1/PFD2)	N°1 + N°2	N°1 + N°2	N°1 + N°2
	ADR/IR	2/2	2/2	3/3

* One unit required for the PNF
** One unit required for the PF
*** Required for autoland
**** Required for autoland with crosswind greater than 12 kt.
Electrical power supply split : device ensuring that both FMGCs are powered by independent electrical sources.

Note : Auto call out function, anti-skid and nose wheel steering are partially monitored by the FMGS.

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - REQUIRED AIRCRAFT EQUIPMENT

A319/A320/A321 CAT II/CAT III

Required Aircraft Equipment (cont'd)

A319/320/321 FLIGHT CREW OPERATING MANUAL	FLIGHT PHASE RELATED PROCEDURES	4.05.70	P 15
	APPROACH	SEQ	REV

Table of equipment required for CAT2 and CAT3 approach and landing :

R

	CAPABILITY → / EQUIPMENT ↓	CAT 2	CAT 3 SINGLE	CAT 3 DUAL
	ADR/IR	2/2	2/2	3/3
CREW MONITORED	AP DISCONNECT PB	2	2	2
	"AP OFF" ECAM WARNING	1	1	1
	"AUTOLAND" LIGHT	1	1	1
	RUDDER TRAVEL LIMIT SYSTEM	1****	1****	1****
	WINDOW HEAT (L or R windshield)	1**	1**	1**
	WINDSHIELD WIPERS OR RAIN REPELLENT (if activated)	1**	1**	1**
	ND DUs	1	2	2
	ANTISKID	0	1	1
	NOSE WHEEL STEERING	0	0	1
	AUTO CALL OUT FUNCTION	0***	1	1
	ATTITUDE INDICATION (STBY)	1	1	1

* One unit required for the PNF
** One unit required for the PF
*** Required for autoland
**** Required for autoland with crosswind greater than 12 kt.
Electrical power supply split : device ensuring that both FMGCs are powered by independent electrical sources.

Note : Auto call out function, anti-skid and nose wheel steering are partially monitored by the FMGS.

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - REQUIRED AIRCRAFT EQUIPMENT

A319/A320/A321 CAT II/CAT III

Required Aircraft Equipment (cont'd)

A319/320/321 FLIGHT CREW OPERATING MANUAL	IRREGULARITIES	4.06.40	P 1
	FMGC RESPONSE TO FAILURE CASES	SEQ	REV

FMGC RESPONSE TO FAILURE CASES

This table shows how the FMGC responds to failures in other parts of the system.

FAILURE CASE	AP/FD	A/THR	LANDING CAPACITIES
FIRST IRS FAILURE *	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND IRS FAILURE	TOTAL LOSS	TOTAL LOSS	RAW DATA
FIRST ADC FAILURE *	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND ADC FAILURE	TOTAL LOSS	TOTAL LOSS	RAW DATA ONLY
FIRST LGCIU FAILURE	NO EFFECT	NO EFFECT	NO EFFECT
SECOND LGCIU FAILURE	TOTAL LOSS EXCEPT IN LAND MODE	TOTAL LOSS	RAW DATA ONLY EXCEPT IN LAND MODE (CAT 2 MAX)
LOSS OF ONE FMS COMPUTATION	LOSS OF ONE AP/FD/ATS EXCEPT IN APPR mode BELOW 700 FT AND GO AROUND MODES		NO EFFECT BELOW 700 FT
FIRST SFCC FAILURE	NO EFFECT	NO EFFECT	NO EFFECT
SECOND SFCC FAILURE	TOTAL LOSS EXCEPT IN LAND MODE	TOTAL LOSS	Raw data EXCEPT IN LAND MODE (CAT 2 MAX)
FIRST RADIOALTIMETER FAILURE	NO EFFECT	NO EFFECT	CAT 2
SECOND RADIOALTIMETER FAILURE	TOTAL LOSS IN APPR MODE (ILS)	NO EFFECT	ILS APPR MODE INOP
TOTAL LOSS OF THE FCU	TOTAL LOSS EXCEPT IN LAND AND GO AROUND	TOTAL LOSS	RAW DATA EXCEPT IN LAND MODE (CAT 2 MAX)
FIRST ILS RECEIVER FAILURE	NO EFFECT	NO EFFECT	CAT 1
SECOND ILS RECEIVER FAILURE	TOTAL LOSS IN APPR mode (ILS)	NO EFFECT	(ILS) APPR MODE INOP
FIRST ELAC FAILURE	NO EFFECT	NO EFFECT	CAT 3 single
SECOND ELAC FAILURE	TOTAL LOSS OF AP	NO EFFECT	CAT 1

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - REQUIRED AIRCRAFT EQUIPMENT

A319/A320/A321 CAT II/CAT III

Required Aircraft Equipment (end)

A319/320/321 FLIGHT CREW OPERATING MANUAL	IRREGULARITIES	4.06.40	P 2
	FMGC RESPONSE TO FAILURE CASES	SEQ	REV

FAILURE CASE	AP/FD	A/THR	LANDING CAPACITIES
FIRST FAC FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND FAC FAILURE	TOTAL LOSS OF AP EXCEPT IN LAND MODE BELOW 100 FT AND BEFORE R/O	TOTAL LOSS	CAT 1 NO EFFECT BELOW 100 FT if previously CAT 2/3
FIRST YAW DAMPER OR RUDDER TRIM FAILURE *	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND YAW DAMPER OR RUDDER TRIM FAILURE	TOTAL LOSS OF AP EXCEPT IN LAND MODE BELOW 100 FT AND BEFORE R/O	NO EFFECT	CAT 1 NO EFFECT BELOW 100 FT if previously CAT 2/3
FIRST BSCU FAILURE	NO EFFECT	NO EFFECT	NO EFFECT
SECOND BSCU FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
TOTAL LOSS OF ONE FADEC	NO EFFECT	TOTAL LOSS	CAT 2
LOSS OF EPR (IAE ONLY)	NO EFFECT	LOSS OF A/THR	CAT 2
FIRST FWC FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND FWC FAILURE	NO EFFECT	NO EFFECT	CAT 1
LOSS OF PFD DATA ON ONE SIDE	NO EFFECT	NO EFFECT	CAT 1
TOTAL LOSS OF ONE FMGC	LOSS OF ONE AP/FD	LOSS OF ONE ATS	CAT 3 SINGLE
DOUBLE HYDRAULIC FAILURE	TOTAL LOSS OF AP	NO EFFECT	CAT 1

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - REQUIRED AIRCRAFT EQUIPMENT

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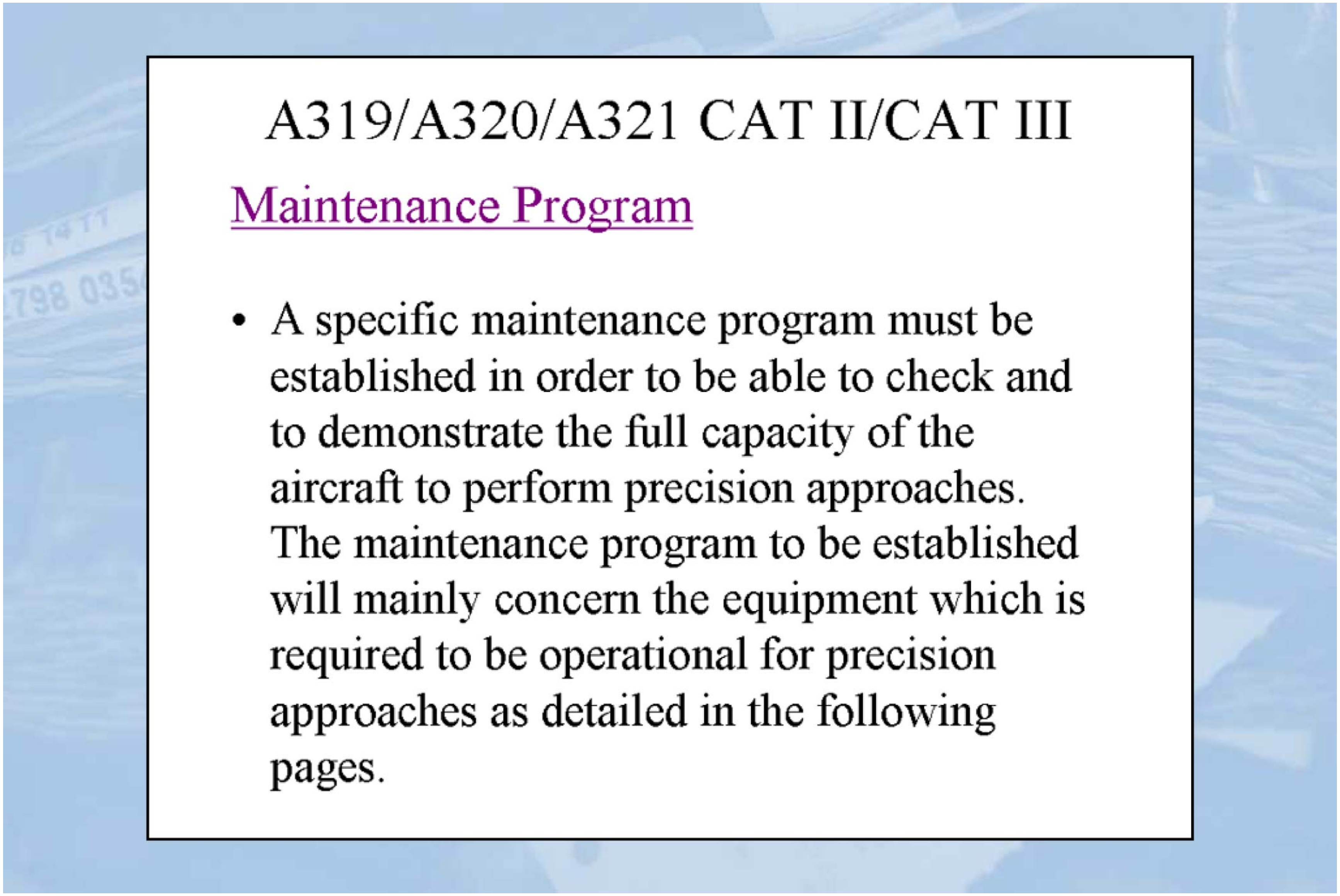
LRU REMOVAL AND REPLACEMENT TECHNIQUES

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT (continued)

Maintenance Program



CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - MAINTENANCE PROGRAM

LRU REMOVAL AND REPLACEMENT TECHNIQUES

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT (continued)

Maintenance Procedure

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A319/A320/A321 CAT II/CAT III

Maintenance Procedure (summary)

- Testing/Validation
  - If one system has been repaired (e.g. change of one LRU) testing is necessary to make sure that CAT III DUAL landing capability is available:
    - Test of individual system being repaired,
    - AFS LAND Test for validation of system integrity.

Note: Validation testing should only be done for full landing capability (CAT III DUAL).

CAT II/ CAT III REQUIRED AIRCRAFT EQUIPMENT - MAINTENANCE PROCEDURE

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LRU REMOVAL AND REPLACEMENT TECHNIQUES

REMOVAL OF THE RADIO ALTIMETER TRANSCEIVER 2SA1 AND 2SA2

A319/A320/A321

AIRCRAFT MAINTENANCE MANUAL

TRANSCEIVER - RADIO ALTIMETER (2SA1,2SA2) - REMOVAL/INSTALLATION

ASK 34-42-33-000-001

emoval of the Radio Altimeter Transceiver 2SA1 and 2SA2

. Reason for the Job

Self Explanatory

. Job Set-up Information

A. Fixtures, Tools, Test and Support Equipment

EFERENCE	QTY	DESIGNATION
o specific		blanking caps
o specific		circuit breaker(s) safety clip(s)
o specific		access platform 2 m (6 ft. 7 in.)

B. Referenced Information

REFERENCE	DESIGNATION
24-42-00-861-001	Energize the Ground Service Network from the External Power
52-30-00-860-001	Open the FWD or AFT Cargo-Compartment Door with the Yellow Electric Pump
4-42-33-991-001	Fig. 401

. Job Set-up

ubtask 34-42-33-861-050

A. Energize the ground service network
(Ref. TASK 24-42-00-861-001)

EFF : ALL

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REMOVAL OF THE RADIO ALTIMETER TRANSCEIVER 2SA1 AND 2SA2

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A319/A320/A321
AIRCRAFT MAINTENANCE MANUAL

Subtask 34-42-33-865-050

B. Open, safety and tag this(these) circuit breaker(s):

PANEL	DESIGNATION	IDENT.	LOCAT
FOR 2SA1			
121VU	COM NAV/RAD ALTM/1	1SA1	K1
FOR 2SA2			
121VU	COM NAV/RAD ALTM/2	1SA2	K1

Subtask 34-42-33-010-050

C. Get Access

(1) Open the AFT Cargo Door 826. (Ref. TASK 52-30-00-860-001)

(2) Put the access platform at the aft cargo door 826.

(3) Remove the access panel 152GW.

4. Procedure

(Ref. Fig. 401/TASK 34-42-33-991-001)

Subtask 34-42-33-020-051

A. Removal of Radio Altimeter Transceiver

NOTE : The removal procedure is the same for the radio altimeter transceiver 2SA1 and 2SA2.

(1) Loosen the knurled nuts (3) and lower the fasteners.

(2) Carefully remove the transceiver (1) from the rack (2).

NOTE : Make sure that you do not damage the electrical connector pins.

(3) Put blanking caps on the disconnected electrical connectors.

EFF : ALL

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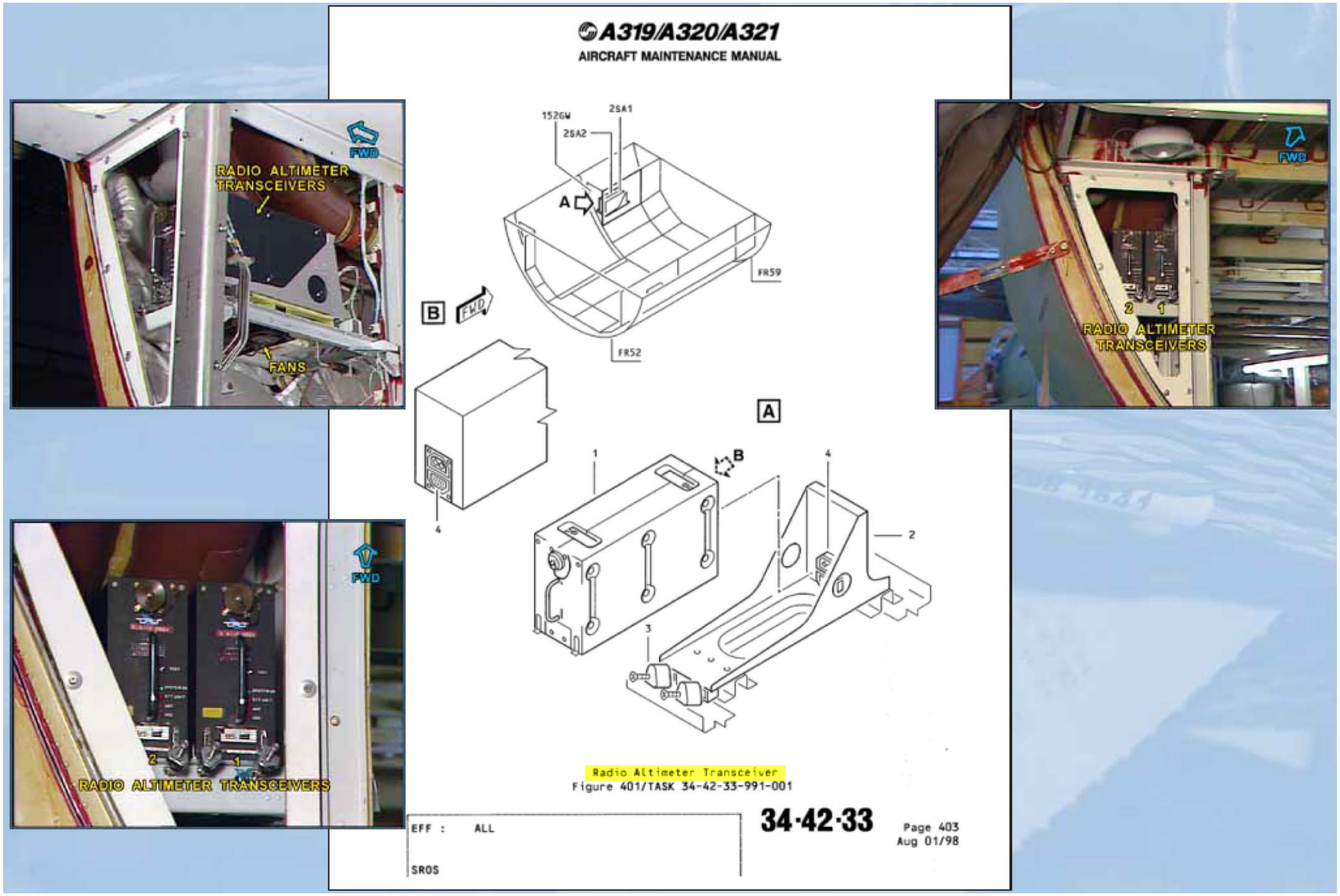
REMOVAL OF THE RADIO ALTIMETER TRANSCEIVER 2SA1 AND 2SA2

X8U08481 - X0332T0 - XM2007000000001



REMOVAL OF THE RADIO ALTIMETER TRANSCEIVER 2SA1 AND 2SA2

X8U08481 - X0332T0 - XM20070000000001

A319/A320/A321

AIRCRAFT MAINTENANCE MANUAL

TASK 34-42-33-400-001

stallation of the Radio Altimeter Transceiver 2SA1 and 2SA2

Reason for the Job

Self Explanatory

Job Set-up Information

A. Fixtures, Tools, Test and Support Equipment

FERENCE	QTY	DESIGNATION
specific		access platform 2 m (6 ft. 7 in.)

B. Referenced Information

FERENCE	DESIGNATION
22-97-00-710-001	Operational Test of the LAND CAT III Capability
24-42-00-861-001	Energize the Ground Service Network from the External Power
24-42-00-862-001	De-energize the Ground Service Network Supplied from the External Power
34-42-00-740-002	BITE Test of the Radio Altimeter
52-30-00-860-001	Open the FWD or AFT Cargo-Compartment Door with the Yellow Electric Pump
-30-00-860-002	Close the FWD or AFT Cargo-Compartment Door with the Yellow Electric Pump
-42-33-991-001	Fig. 401

Job Set-up

btask 34-42-33-860-050

A. Aircraft Maintenance Configuration

(1) Make sure that the ground service network is energized (Ref. TASK 24-42-00-861-001)

(2) Make sure that the AFT cargo-compartment door (Ref. TASK 52-30-00-860-001) is open.

EFF : ALL

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REMOVAL OF THE RADIO ALTIMETER TRANSCEIVER 2SA1 AND 2SA2

A319/A320/A321
AIRCRAFT MAINTENANCE MANUAL

R (3) Make sure that the access panel 152GW is removed.

(4) Make sure that the access platform is in position at the Aft cargo door 826.

ubtask 34-42-33-865-051

B. Make sure that this(these) circuit breaker(s) is(are) open, safetied an tagged

ANEL DESIGNATION	IDENT.	LOCATI
OR 2SA1		
121VU COM NAV/RAD ALTM/1	1SA1	K11
OR 2SA2		
121VU COM NAV/RAD ALTM/2	1SA2	K12

. Procedure

(Ref. Fig. 401/TASK 34-42-33-991-001)

ubtask 34-42-33-420-050

A. Installation of the Radio Altimeter Transceiver

NOTE : The installation procedure is the same for the radio altimeter transceiver 2SA1 and 2SA2.

(1) Clean the component interface and/or the adjacent area.

(2) Do an inspection of the component interface and/or the adjacent area.

(3) Remove the blanking caps from the electrical connectors.

(4) Make sure that the electrical connectors are clean and in the correct condition.

(5) Carefully install the transceiver (1) into the rack (2).

NOTE : Make sure that the transceiver is correctly aligned to prevent damage to the electrical connectors (4).

(6) Lift the fasteners and tighten the knurled nuts (3) until the transceiver (1) is correctly attached.

EFF : ALL

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REMOVAL OF THE RADIO ALTIMETER TRANSCEIVER 2SA1 AND 2SA2

A319/A320/A321
AIRCRAFT MAINTENANCE MANUAL

Subtask 34-42-33-865-052

B. Remove the safety clip(s) and the tag(s) and close this(these) circuit
breaker(s):
FOR 2SA1
1SA1
FOR 2SA2
1SA2

Subtask 34-42-33-740-050

C. Do the BITE test of the radio altimeter (Ref. TASK 34-42-00-740-002).

NOTE : If the aircraft is operated in actual CAT 3 conditions, you mu
also do the LAND CAT III capability test: (Ref. TASK 22-97-00-
001).

5. Close-up

Subtask 34-42-33-860-051

A. Aircraft Maintenance Configuration

(1) In the cockpit, on the overhead panel 23VU, push and release the
CTL/ELAC 1 pushbutton switch. Make sure that the OFF legend comes
and then goes off.

(2) In the cockpit, on the overhead panel 24VU, push and release the FLT
CTL/ELAC 2 pushbutton switch. Make sure that the OFF legend comes on
and then goes off.

Subtask 34-42-33-410-052

B. Close Access

(1) Make sure that the work area is clean and clear of tool(s) and other
items.

(2) Install the access panel 152GW.

(3) Remove the access platform(s).

(4) Close the AFT Cargo Door 826 (Ref. TASK 52-30-00-860-002).

EFF : ALL

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REMOVAL OF THE RADIO ALTIMETER TRANSCEIVER 2SA1 AND 2SA2

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Subtask 34-42-33-862-050

C. De-energize the ground service network
(Ref. TASK 24-42-00-862-001)

EFF : ALL
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REMOVAL OF THE RADIO ALTIMETER TRANSCEIVER 2SA1 AND 2SA2

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LRU REMOVAL AND REPLACEMENT TECHNIQUES

REMOVAL OF A LRU

X8U08481 - X0332T0 - XM2007000000001

REMOVAL OF A LRU

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LRU REMOVAL AND REPLACEMENT TECHNIQUES

BITE TEST OF THE RADIO ALTIMETER

X8U08481 - X0332T0 - XM2007000000001

A319/A320/A321

AIRCRAFT MAINTENANCE MANUAL

RADIO ALTIMETER - ADJUSTMENT/TEST

ASK 34-42-00-740-002

ITE Test of the Radio Altimeter

ARNING : MAKE SURE THAT ALL THE CIRCUITS IN MAINTENANCE ARE ISOLATED BEFORE YOU SUPPLY ELECTRICAL POWER TO THE AIRCRAFT.

. Reason for the Job

Self Explanatory

. Job Set-up Information

A. Referenced Information

	EFERENCE	DESIGNATION
	24-41-00-861-002	Energize the Aircraft Electrical Circuits from the External Power
	24-41-00-862-002	De-energize the Aircraft Electrical Circuits Supplied from the External Power
	31-32-00-860-010	Procedure to Get Access to the SYSTEM REPORT/TEST NAV Page
	31-60-00-860-001	EIS Start Procedure
	31-60-00-860-002	EIS Stop Procedure
R	34-10-00-860-002	ADIRS Start Procedure
R	34-10-00-860-005	ADIRS Stop Procedure

3. Job Set-up

Subtask 34-42-00-860-054

A. Aircraft Maintenance Configuration

(1) Energize the aircraft electrical circuits (Ref. TASK 24-41-00-861-002).

(2) Do the EIS start procedure (PFDs only) (Ref. TASK 31-60-00-860-001).

R (3) Do the ADIRS Start Procedure (Ref. TASK 34-10-00-860-002).

R (4) On the center pedestral, on one MCDU, get the SYSTEM REPORT/TEST/NAV page (Ref. TASK 31-32-00-860-010).

EFF : ALL

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BITE TEST OF THE RADIO ALTIMETER

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A319/A320/A321
AIRCRAFT MAINTENANCE MANUAL

Subtask 34-42-00-865-056

B. Make sure that this(these) circuit breaker(s) is(are) closed:

PANEL	DESIGNATION	IDENT.	LOCATION
121VU	COM NAV/RAD ALTM/2	1SA2	K12
121VU	COM NAV/RAD ALTM/1	1SA1	K11

4. Procedure

Subtask 34-42-00-740-051

A. BITE Test

NOTE : - During the test, you can hear auto call out announcements 40 or 41 or 42.
- You must open the RA1 circuit breaker to hear auto call out announcements during the RA2 ARINC TEST.

ACTION	RESULT
On the MCDU:	
- get the LRRA1 (LRRA2) page then push the line key adjacent to the ARINC TEST indication.	On the CAPT (F/O PFD): - the bottom sector line moves down from the horizon line. - the radio altitude indication is 40 ft. At the end of the test, on the MCDU, the NO FAILURE DETECTED message comes into view.
- push the line key adjacent to the RETURN indication.	On the CAPT (F/O PFD): - the bottom sector line moves up to the horizon line. - the radio altitude indication is 0 ft. On the MCDU, the LRRA1 (LRRA2) page comes into view.

R

EFF : ALL

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BITE TEST OF THE RADIO ALTIMETER

A319/A320/A321

AIRCRAFT MAINTENANCE MANUAL

5. Close-up

Subtask 34-42-00-860-055

A. Put the aircraft back to its initial configuration.

(1) Do the ADIRS stop procedure (Ref. TASK 34-10-00-860-005).

(2) Do the EIS stop procedure (Ref. TASK 31-60-00-860-002).

(3) On the center pedestal, on the MCDU, push the line key adjacent to the RETURN indication until the MCDU MENU page comes into view.

(4) De-energize the aircraft electrical circuits (Ref. TASK 24-41-00-862-002).

(5) Make sure that the work area is clean and clear of tool(s) and other items.

R EFF : ALL

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BITE TEST OF THE RADIO ALTIMETER

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BITE TEST OF THE RADIO ALTIMETER

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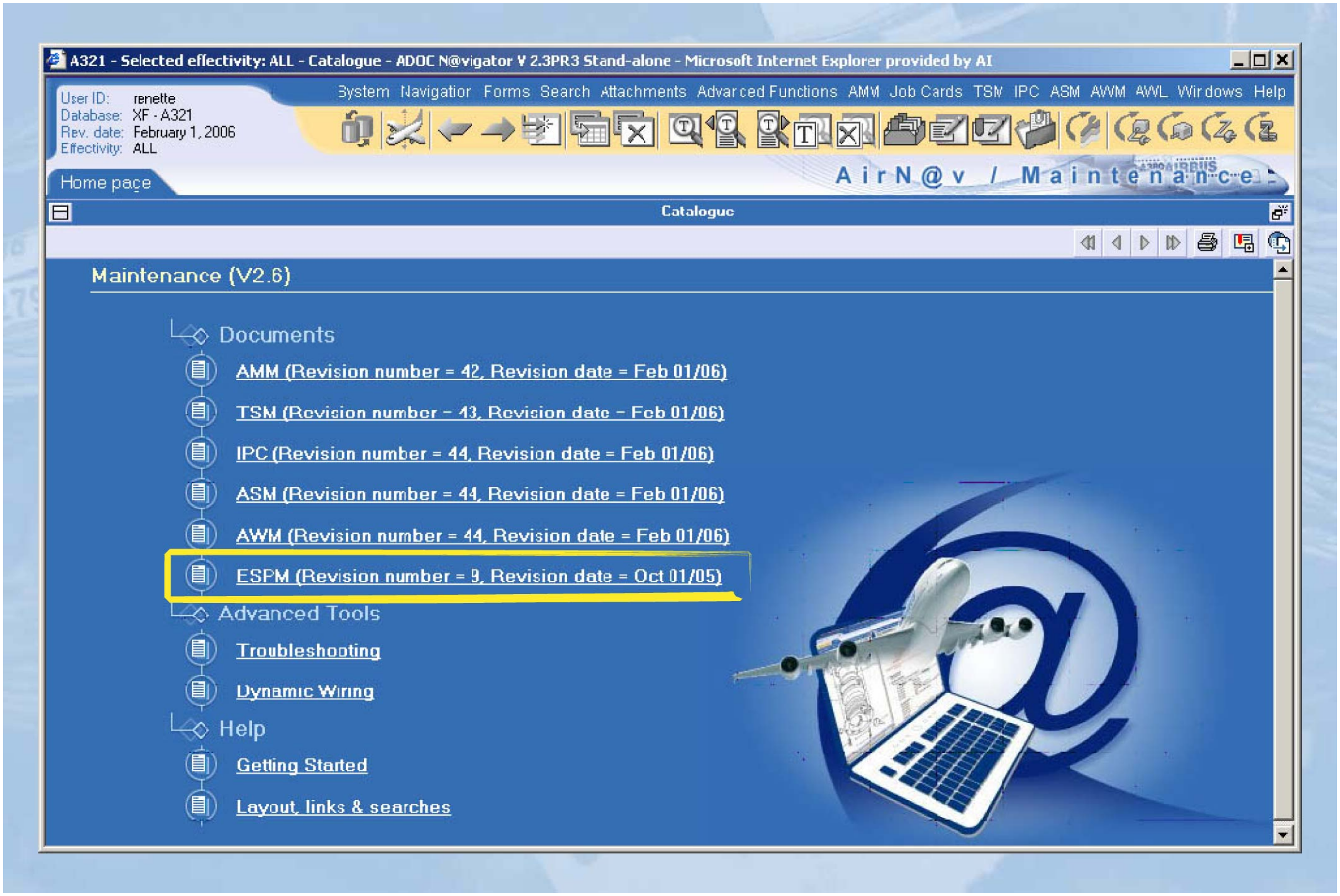
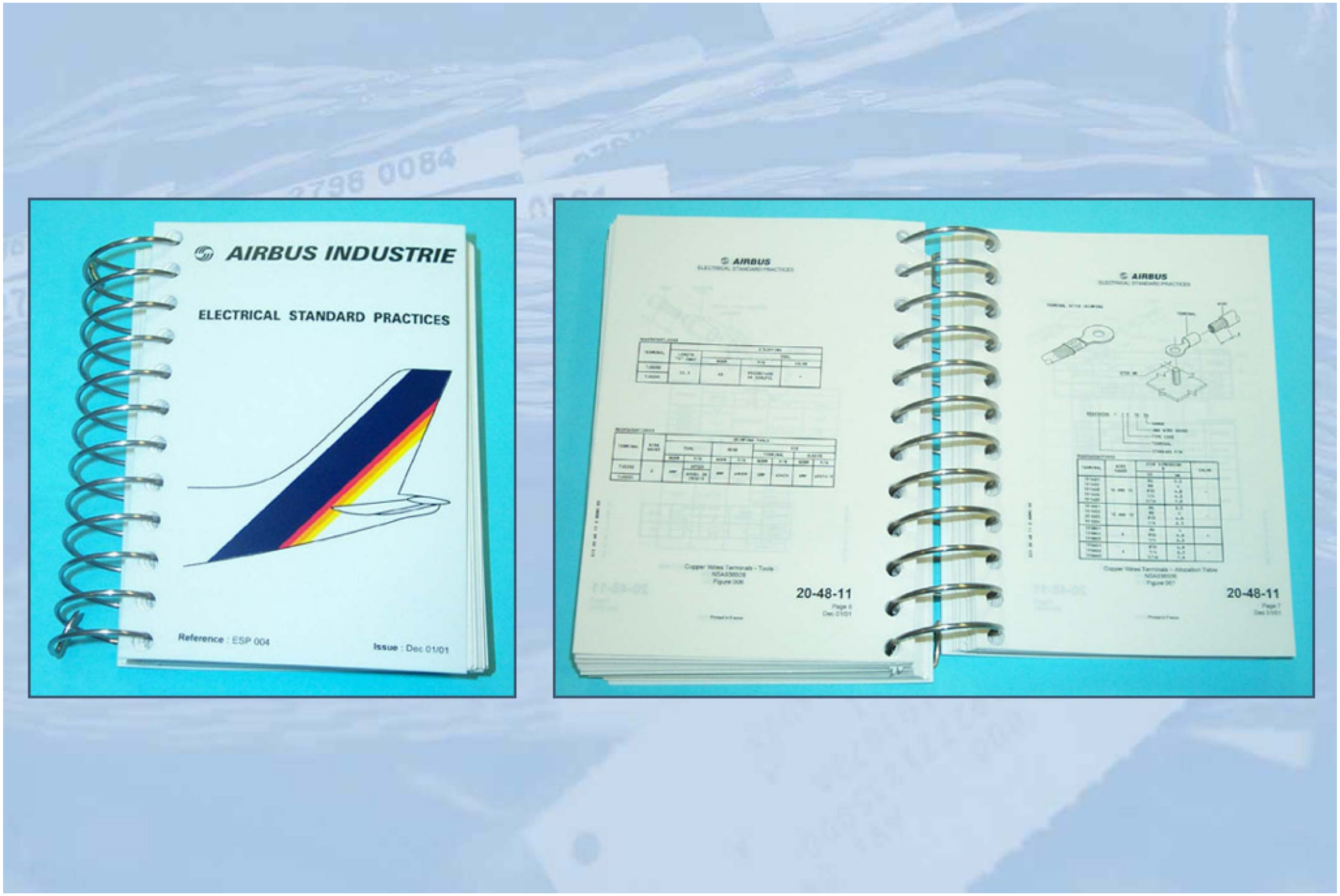
CHAPTER 20 STRUCTURE / OVERVIEW

STRUCTURE OVERVIEW

General presentation of the ESPM:
E : Electrical
S : Standard
P : Practices
M : Manual
The ESPM is a product that is updated every 6 months. It replaces the WDM chapter 20 which was duplicated in the different wiring manuals: AWM, ASM, AWL and for each AIRBUS aircraft.
Consequently, your ESPM is applicable to all AIRBUS aircraft; this includes your existing fleet and the aircraft that will integrate it.
The ESPM provides a quick and easy access to the information associated with connectors and connecting parts, such as contacts, terminals and splices.
This is the ESP (Electrical Standard Practices).
This document is only an extract of the ESPM. It has been created in pocket format to permit you to have it in your toolbox.
Structure of the ESPM.
Like all manuals, there is a list of effective pages (LEP) and a table of contents (TOC).
The INTRO:
In the introduction, you have general information concerning the manual and the HOW TO USE guide. The HOW TO USE guide explains how to retrieve and search information with practical examples.
The INDEXES:
There are two different types of indexes. An alphabetical index, which allows you to find information with a keyword, and an alphanumerical index, which allows you to retrieve a Part Number in the document.
Now, the safety practices.
The safety practices give you warnings and cautions you have to closely follow. This information does not replace your local regulations.
The standard tools:
This part gives you all the information on the tools quoted in the different tables of the document. For example, you have a geometrical representation of each tool and a typical utilization procedure.
To easily understand the document, the data is classified and standard rules and recommendations are provided.
The standard electrical items and connecting parts.
And the maintenance processes.
All the information contained in theses different parts are retrievable through the indexes.



STRUCTURE OVERVIEW



STRUCTURE OVERVIEW

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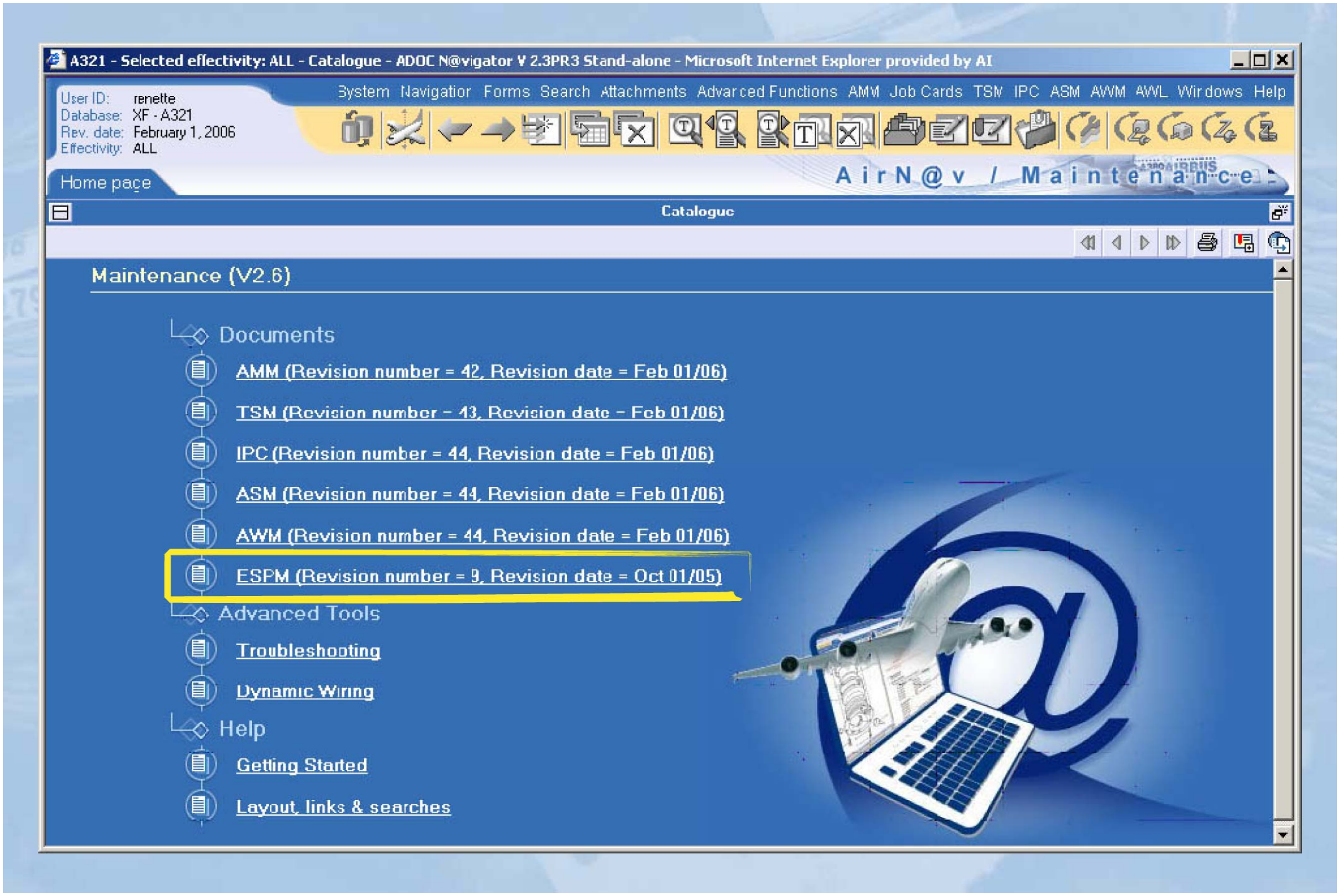
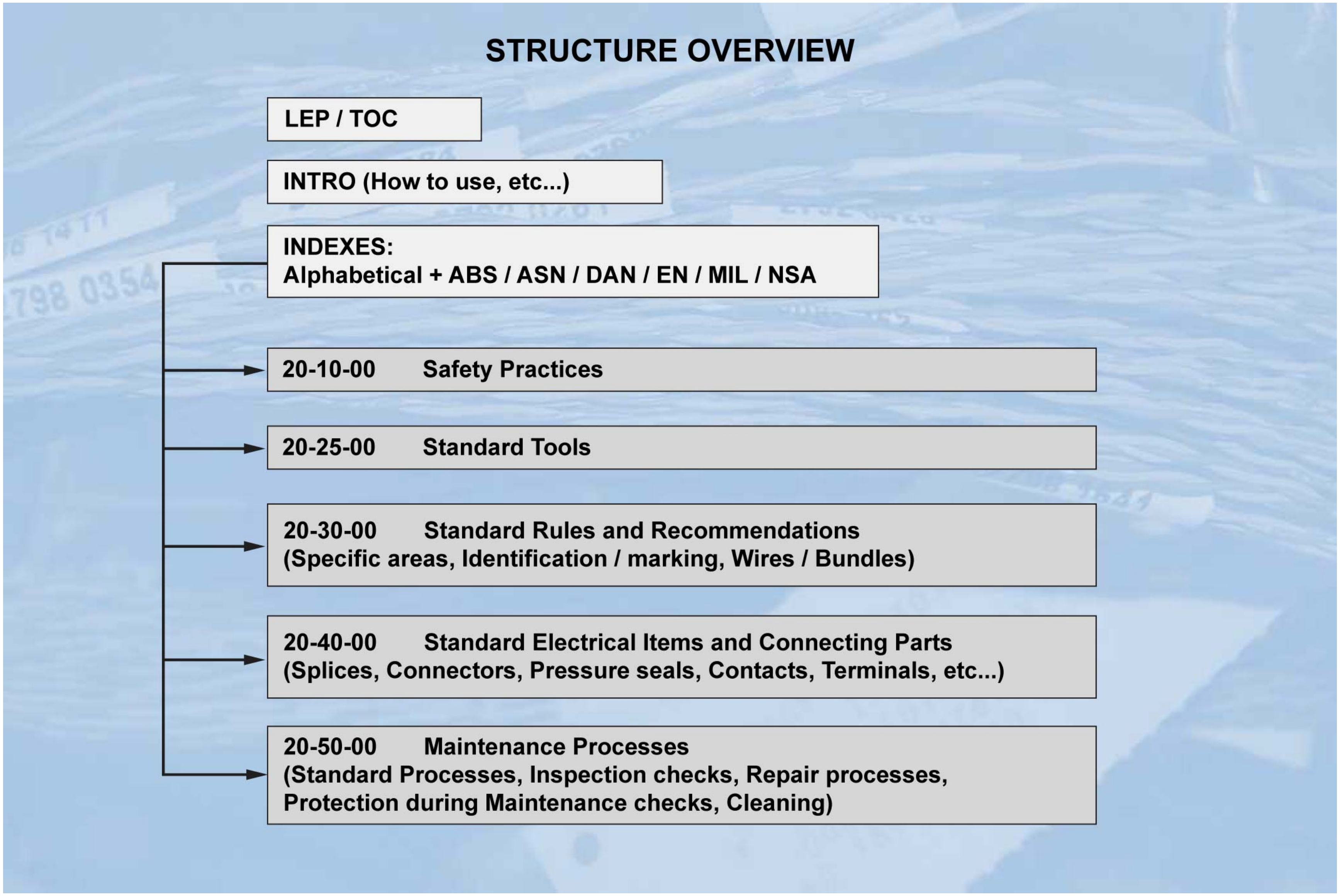


STRUCTURE OVERVIEW



STRUCTURE OVERVIEW

X8U08481 - X0332T0 - XM2008000000001

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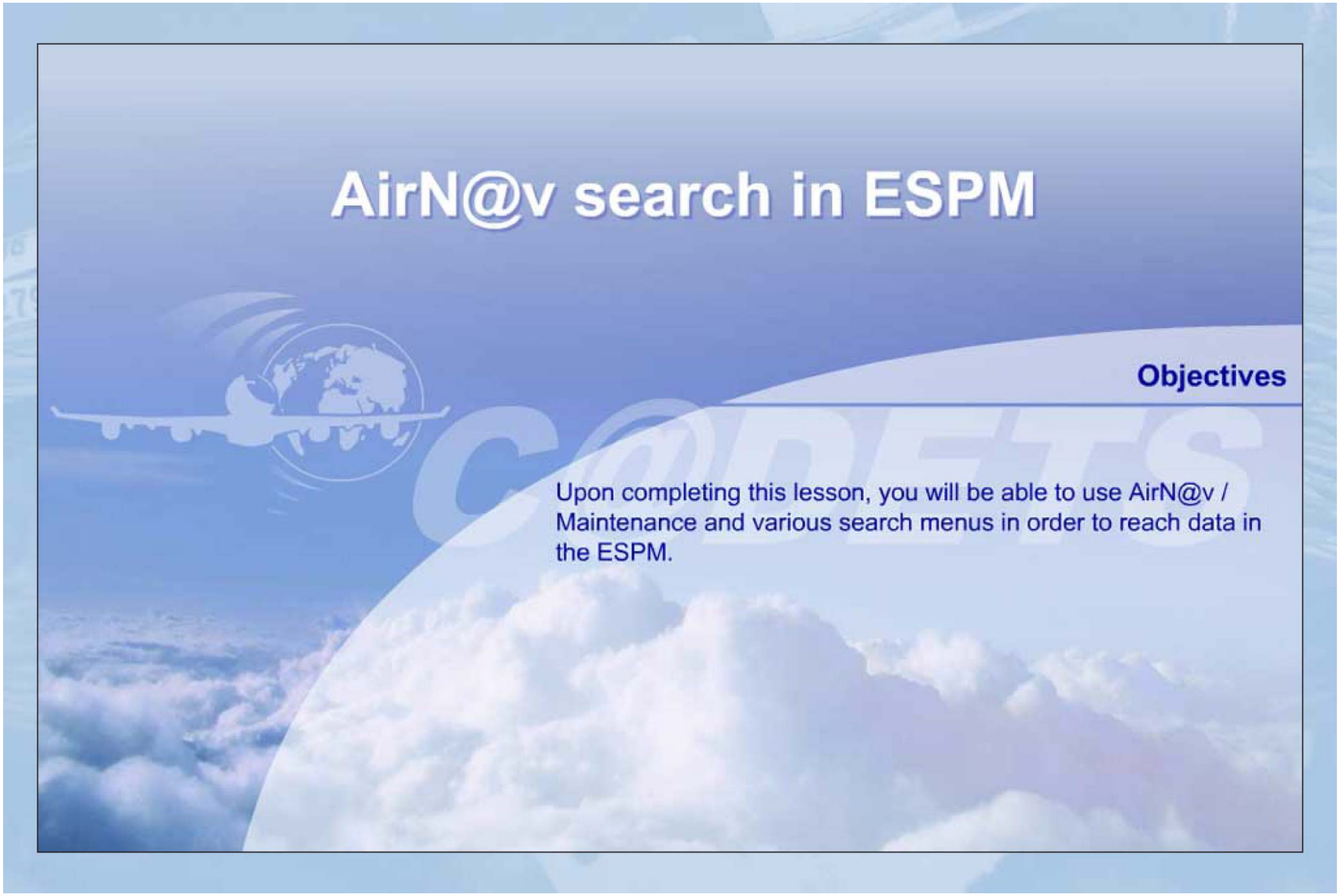
CHAPTER 20 STRUCTURE / OVERVIEW

AIRN@V SEARCH IN ESPM



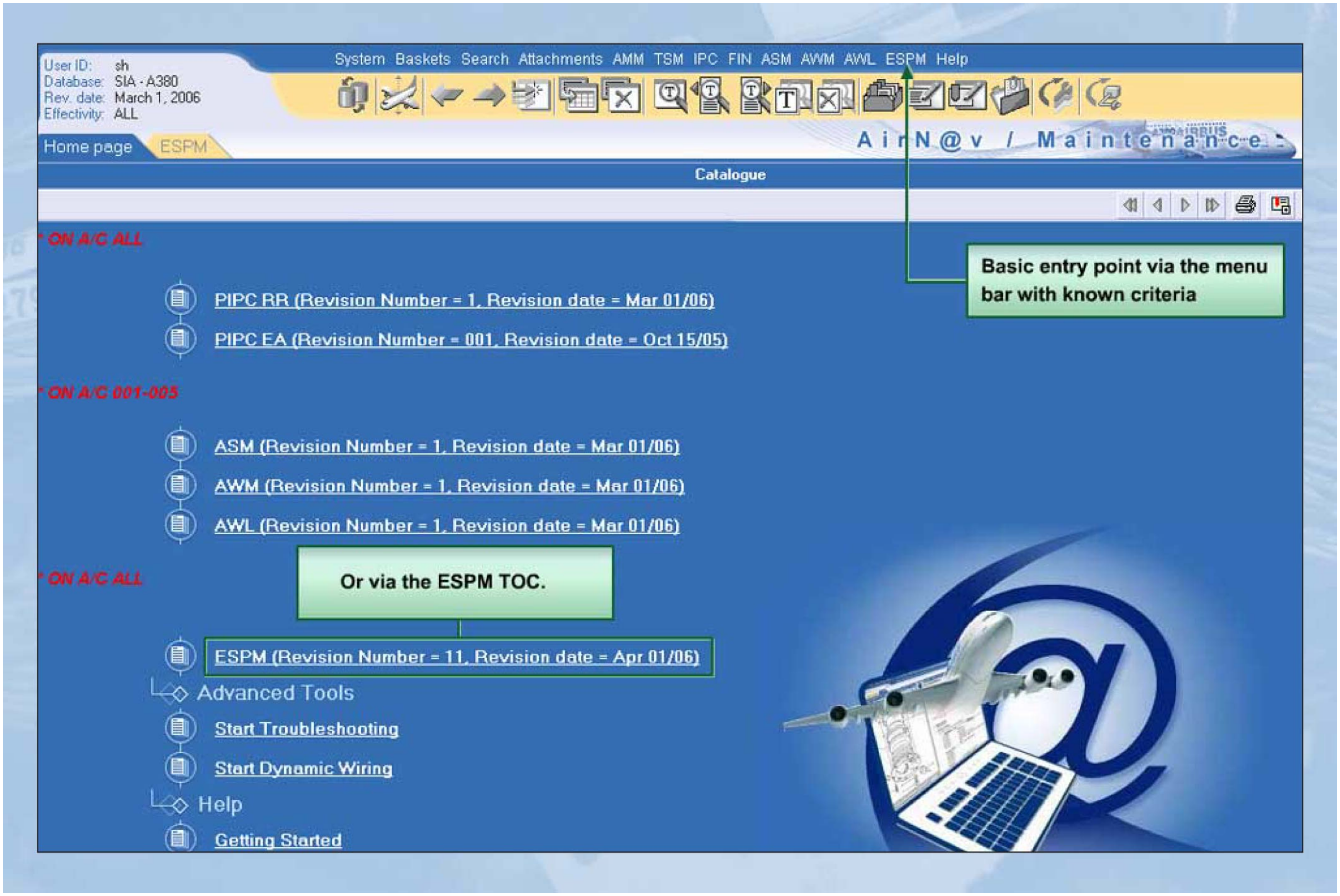
AIRN@V SEARCH IN ESPM

CHAPTER 20 STRUCTURE / OVERVIEW

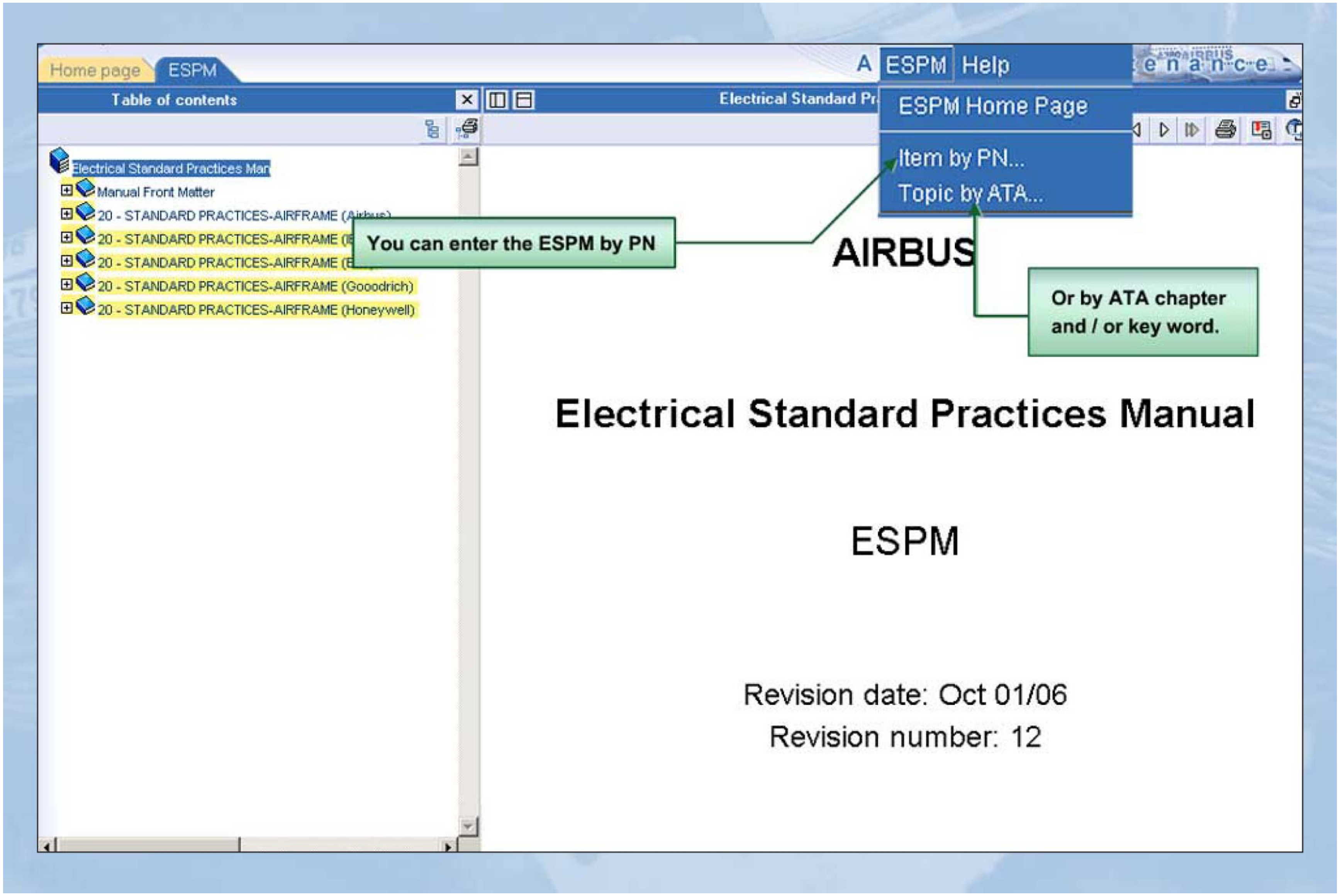
AIRN@V SEARCH IN ESPM (continued)

Entry in ESPM

X8U08481 - X0332T0 - XM2008000000001



AIRN@V SEARCH IN ESPM - ENTRY IN ESPM



AIRN@V SEARCH IN ESPM - ENTRY IN ESPM

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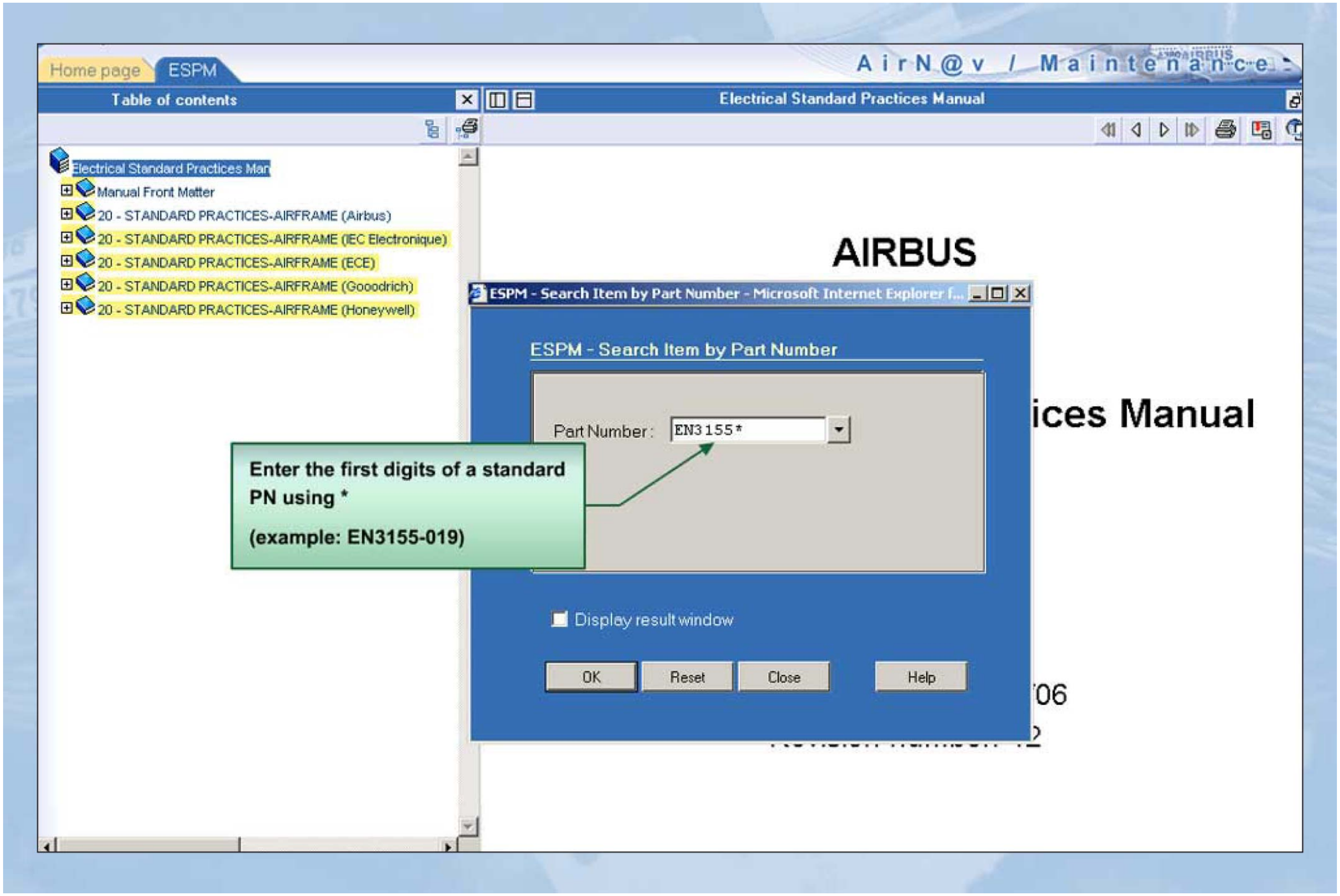
CHAPTER 20 STRUCTURE / OVERVIEW

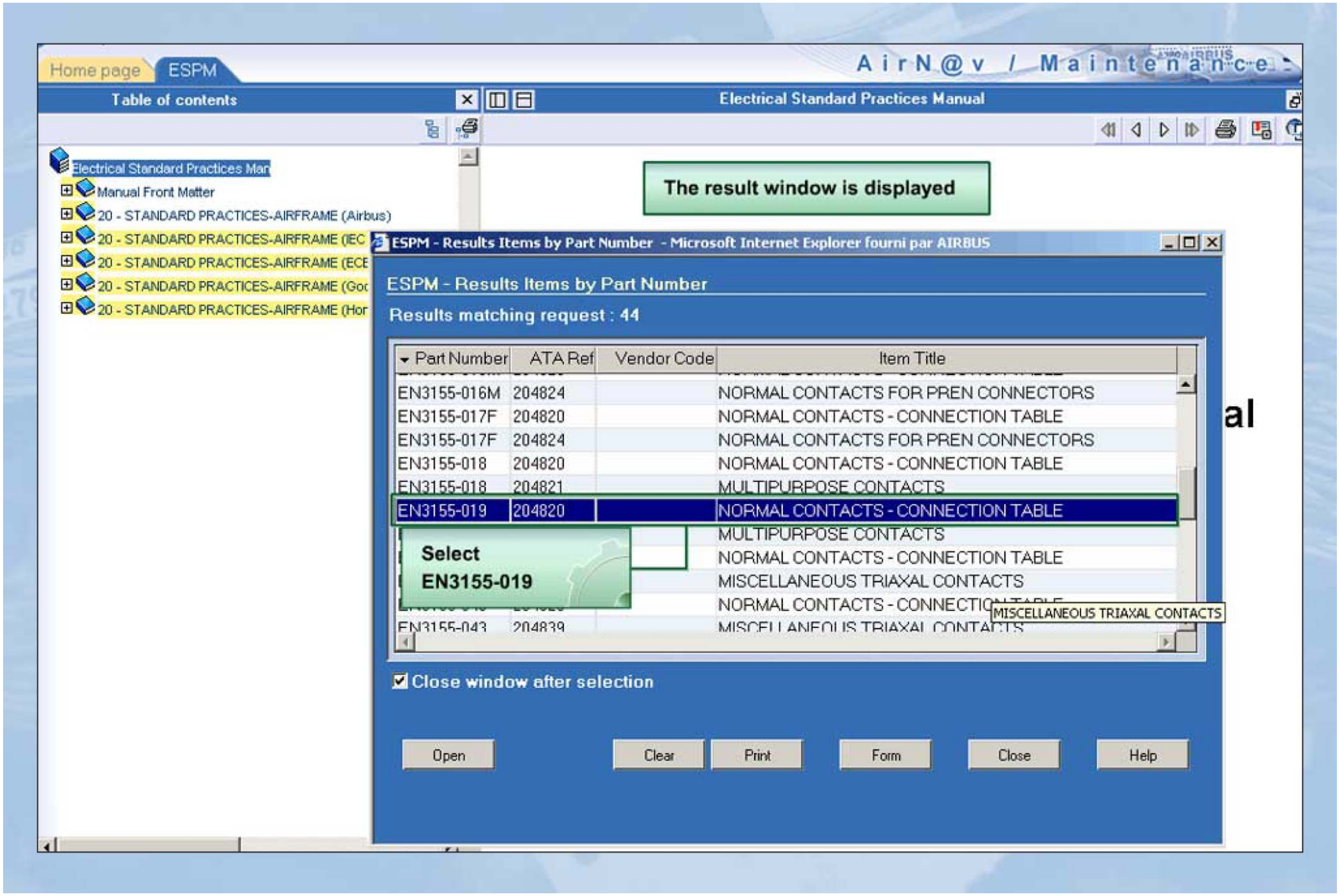
AIRN@V SEARCH IN ESPM (continued)

Search by Standard PN

X8U08481 - X0332T0 - XM2008000000001



AIRN@V SEARCH IN ESPM - SEARCH BY STANDARD PN



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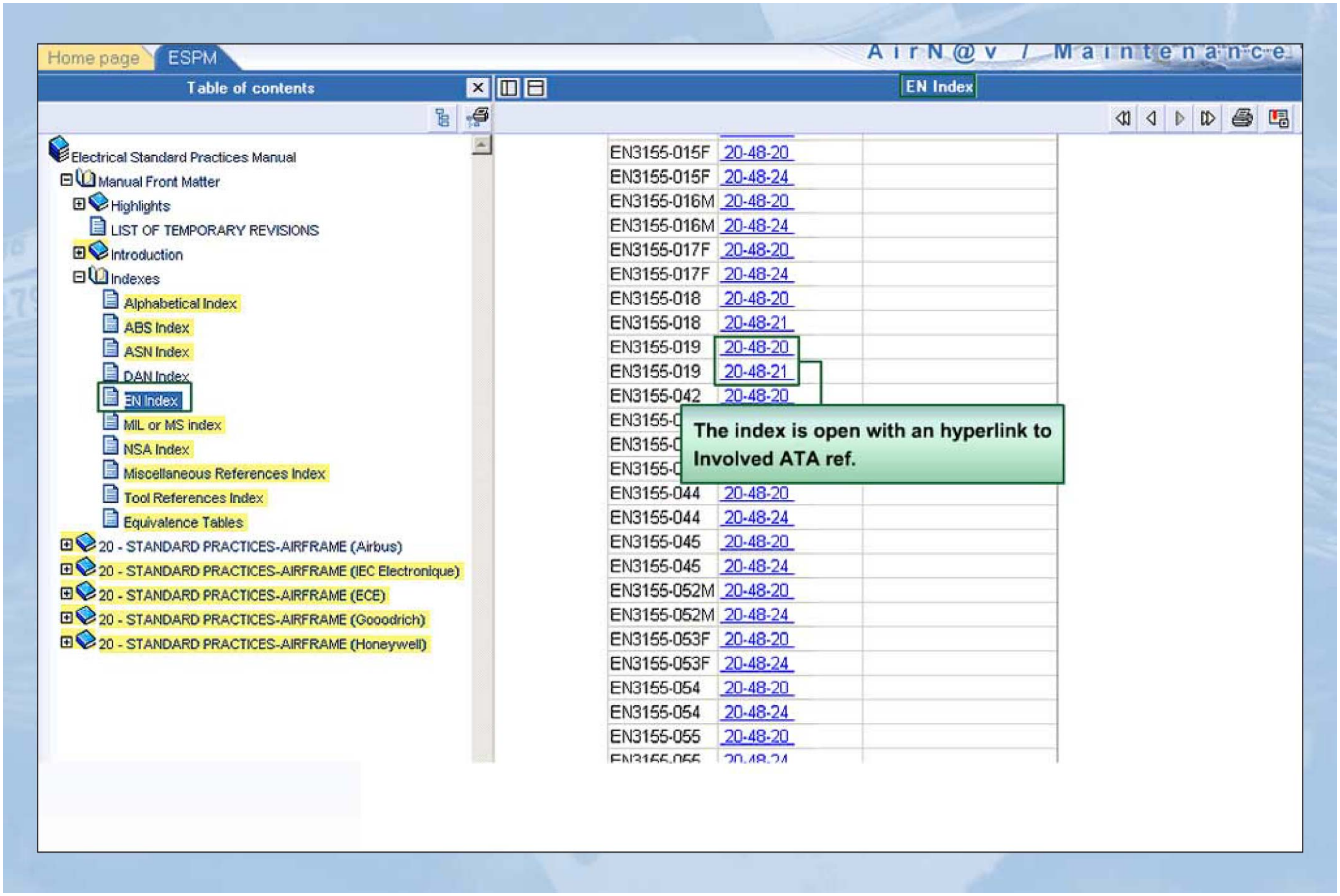

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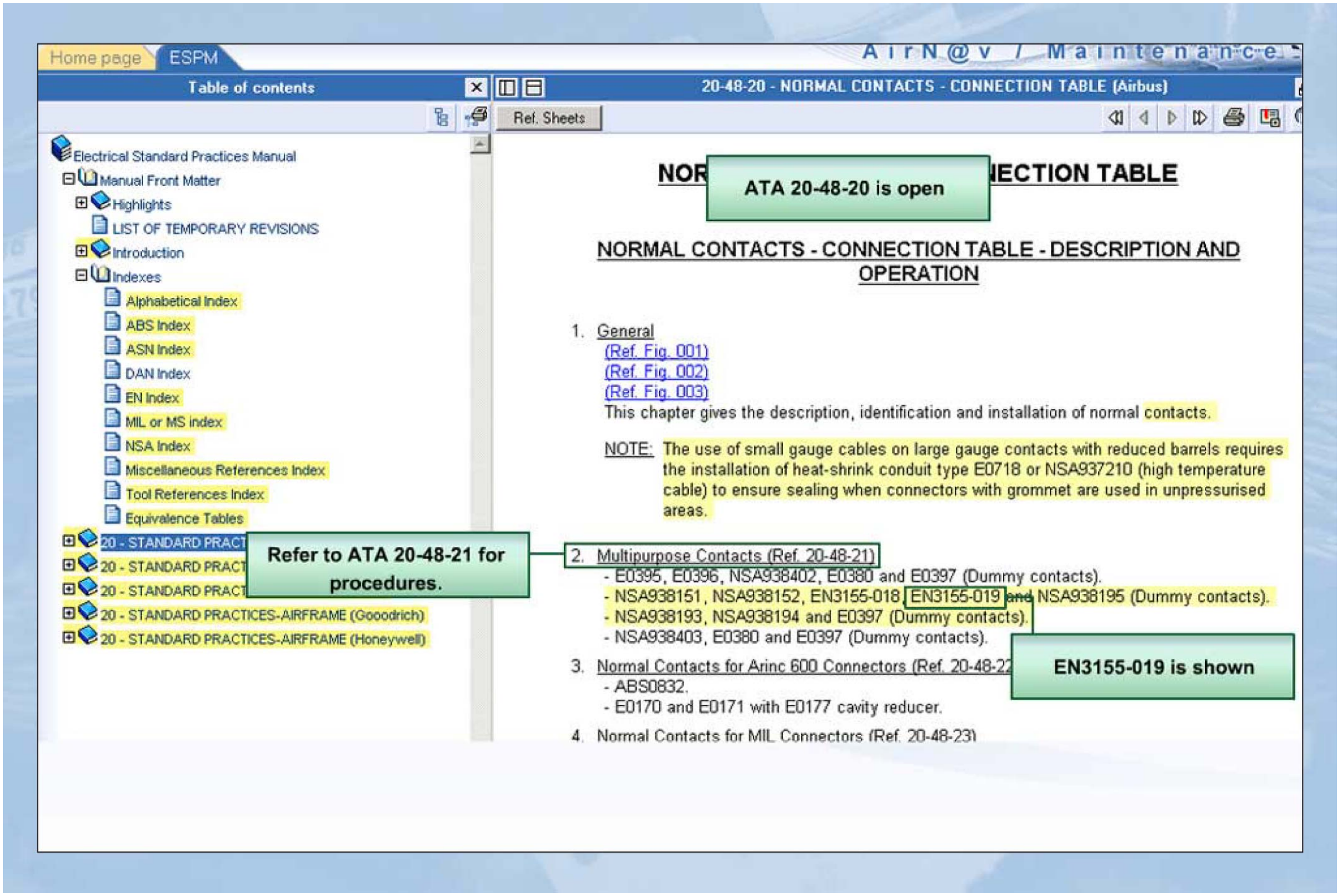
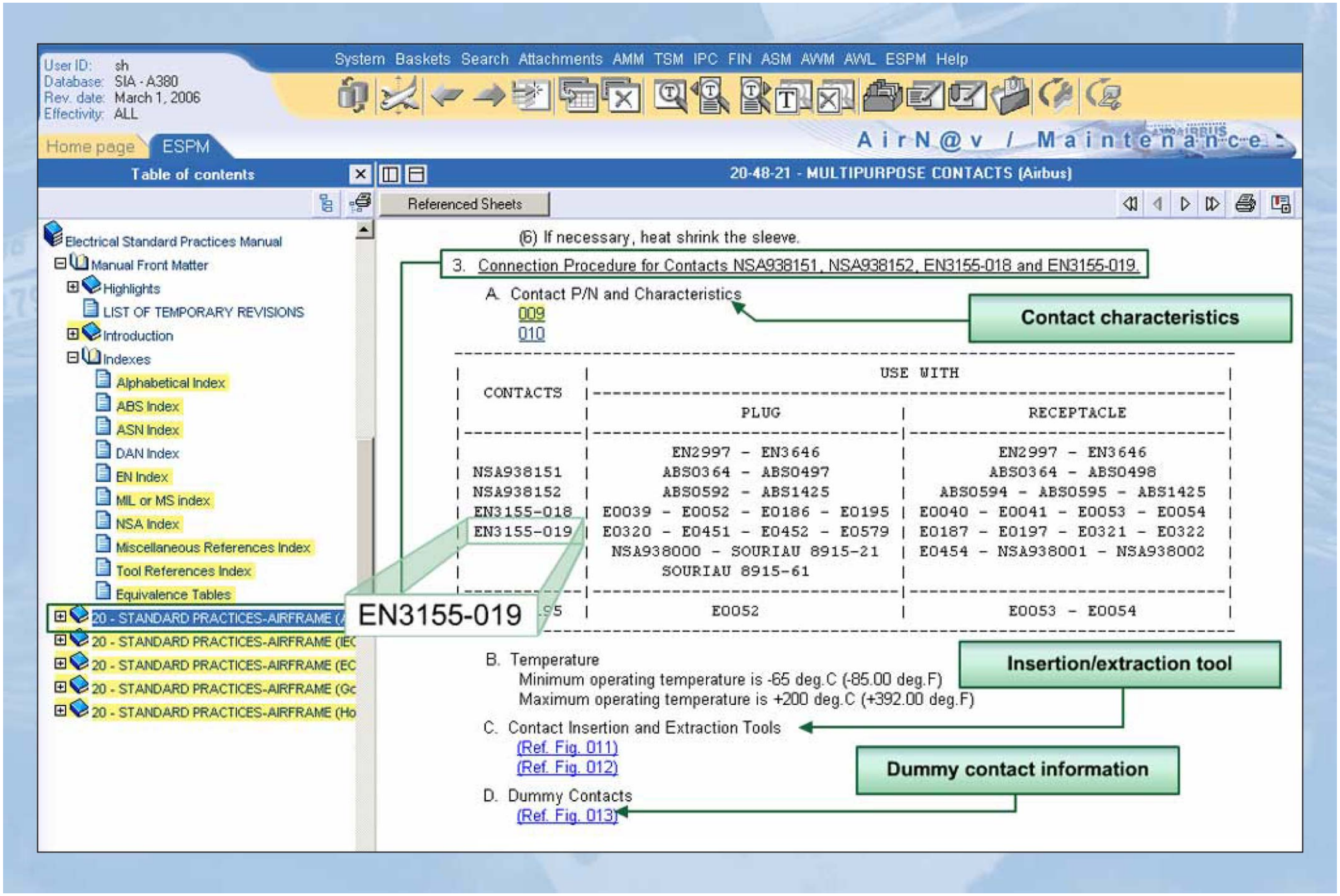


AIRN@V SEARCH IN ESPM - SEARCH BY STANDARD PN



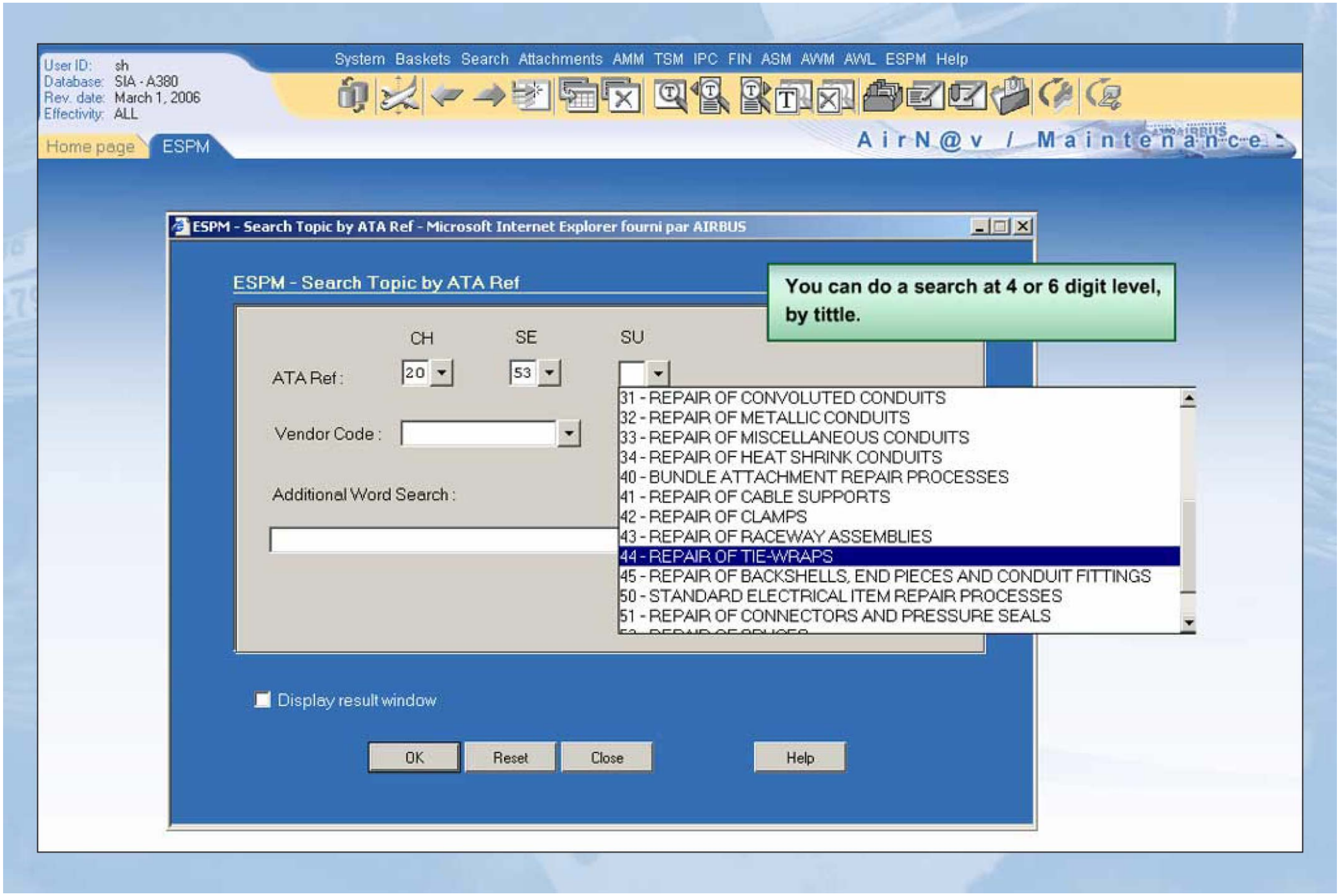
AIRN@V SEARCH IN ESPM - SEARCH BY STANDARD PN

CHAPTER 20 STRUCTURE / OVERVIEW

AIRN@V SEARCH IN ESPM (continued)

Search by title

X8U08481 - X0332T0 - XM2008000000001



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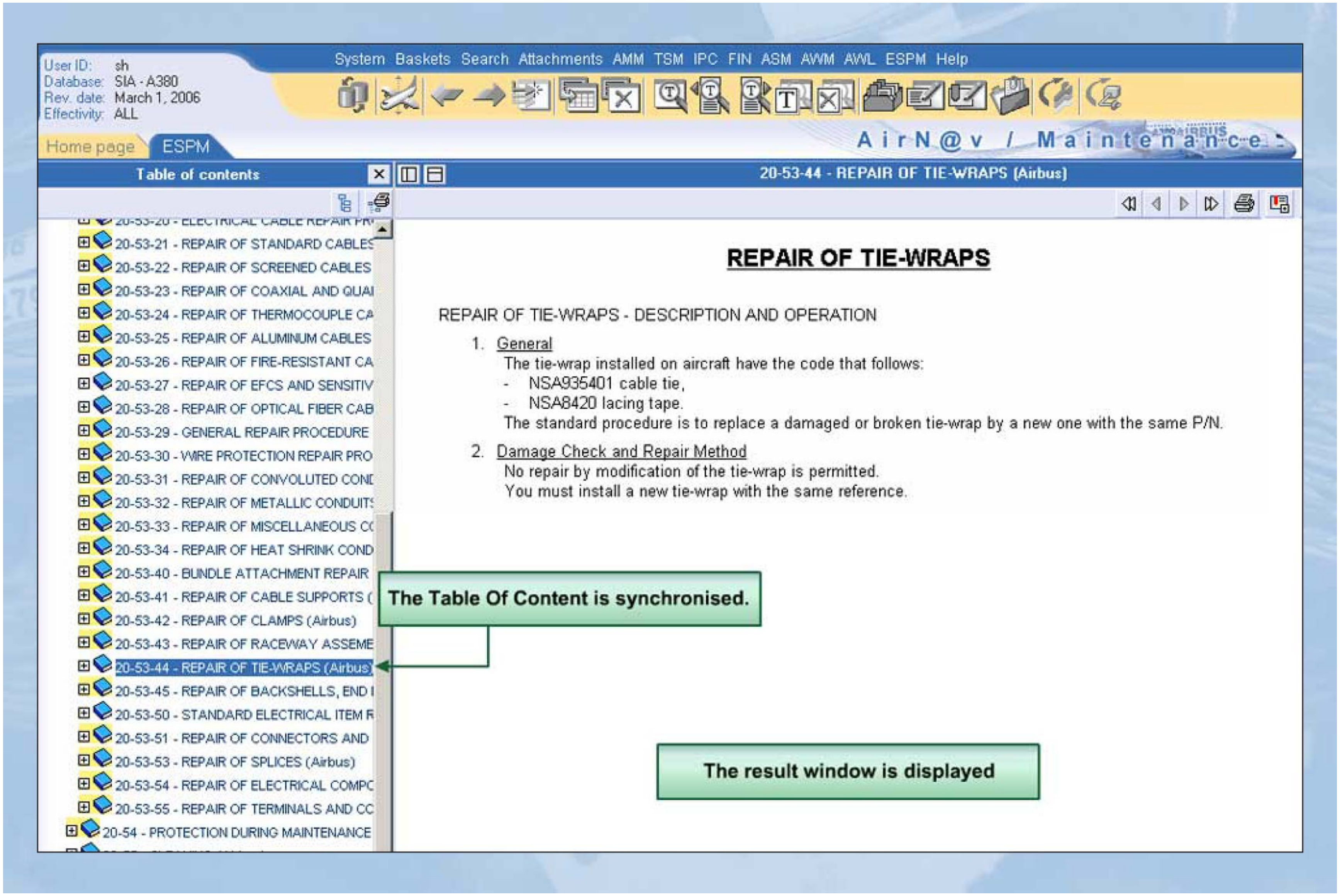

AIRN@V SEARCH IN ESPM - SEARCH BY TITLE

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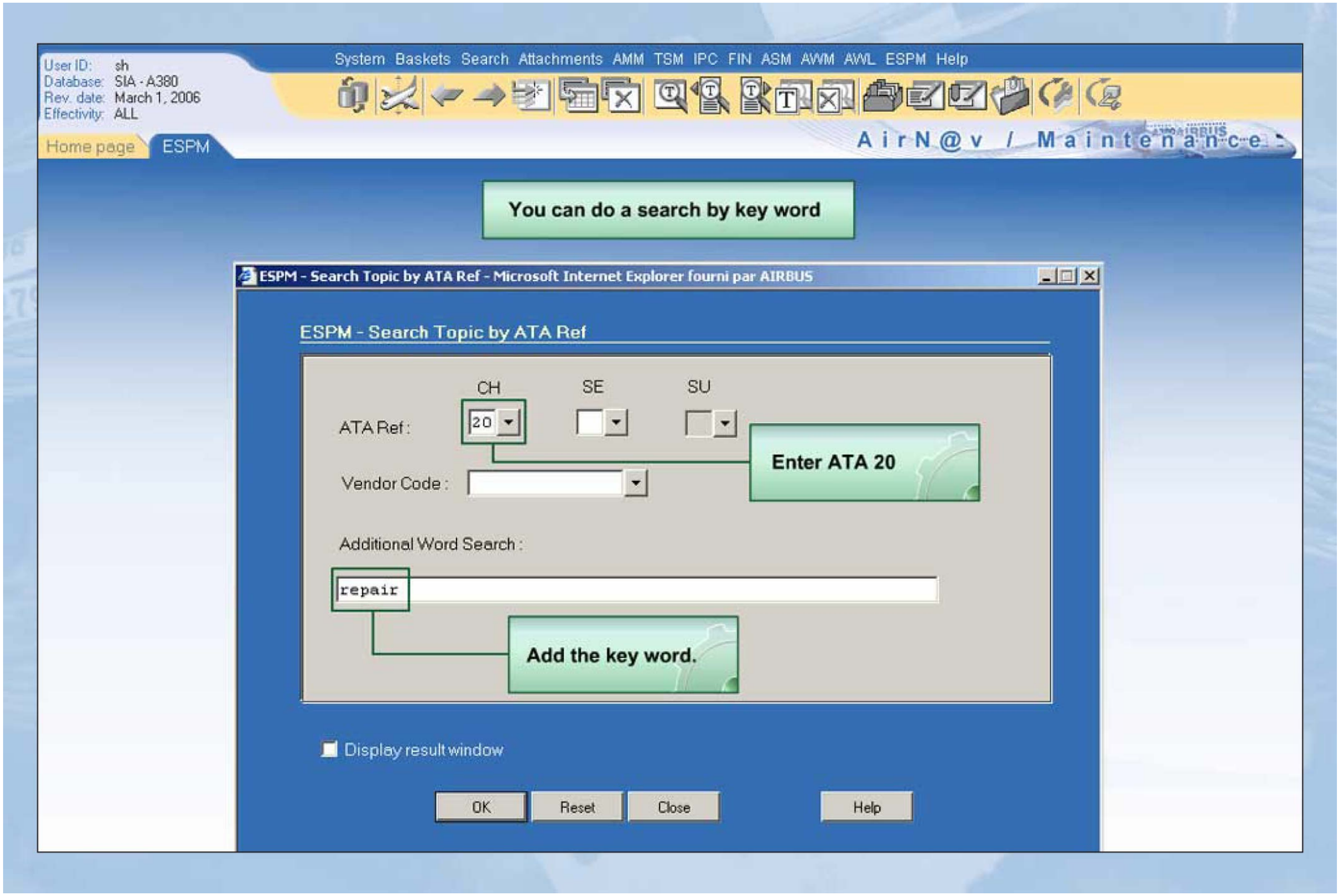
CHAPTER 20 STRUCTURE / OVERVIEW

AIRN@V SEARCH IN ESPM (continued)

Search by keyword

X8U08481 - X0332T0 - XM2008000000001



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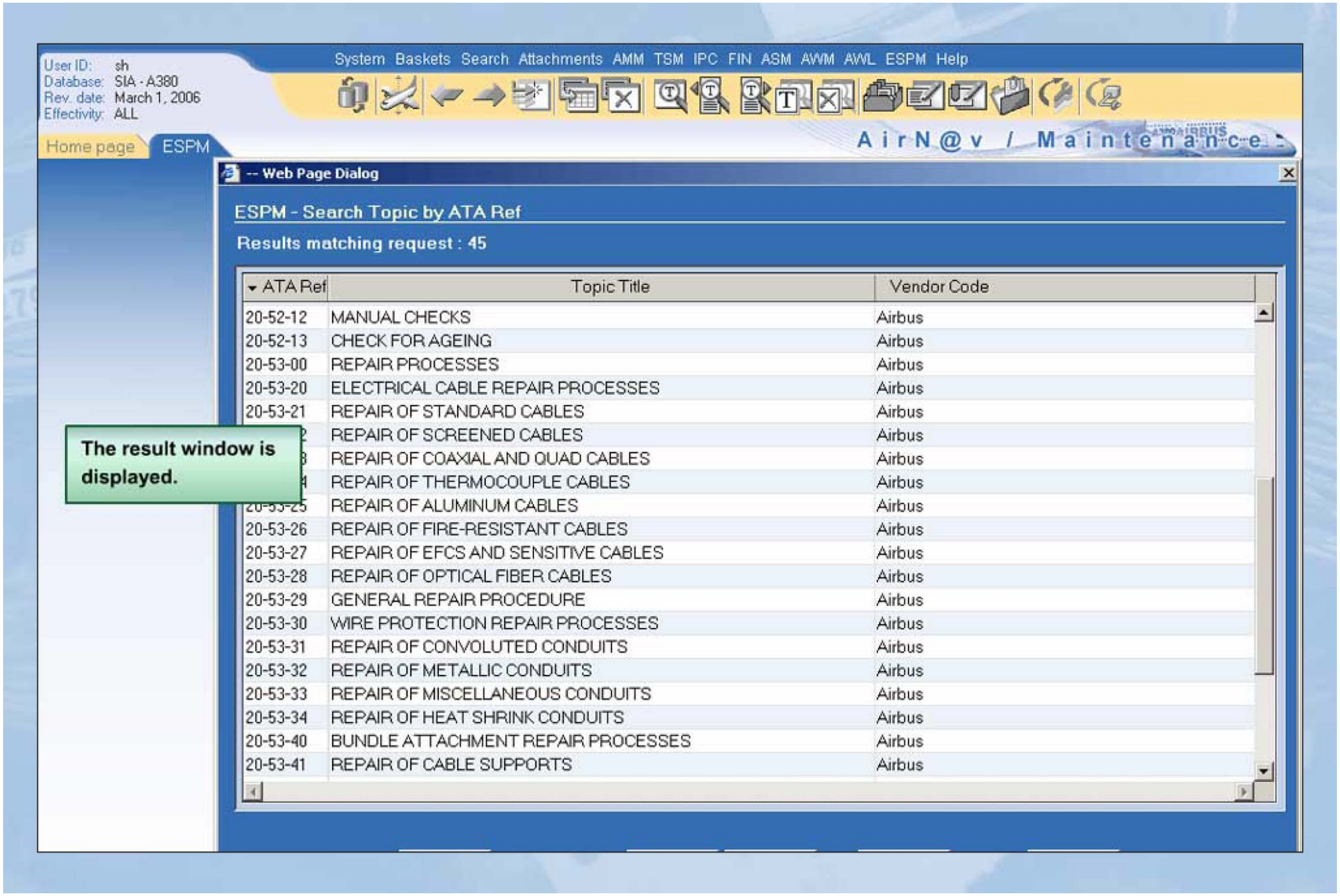

AIRN@V SEARCH IN ESPM - SEARCH BY KEYWORD

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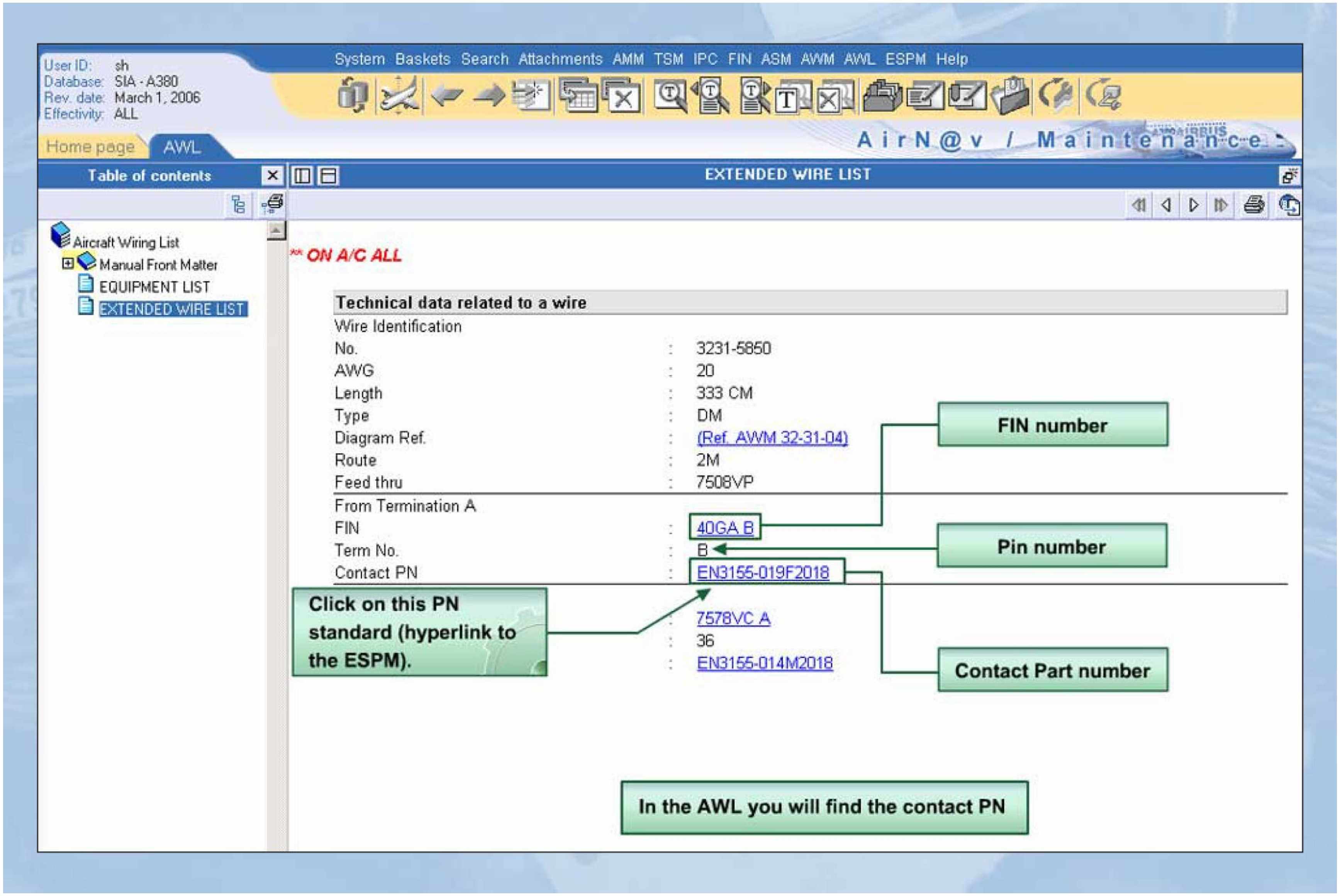
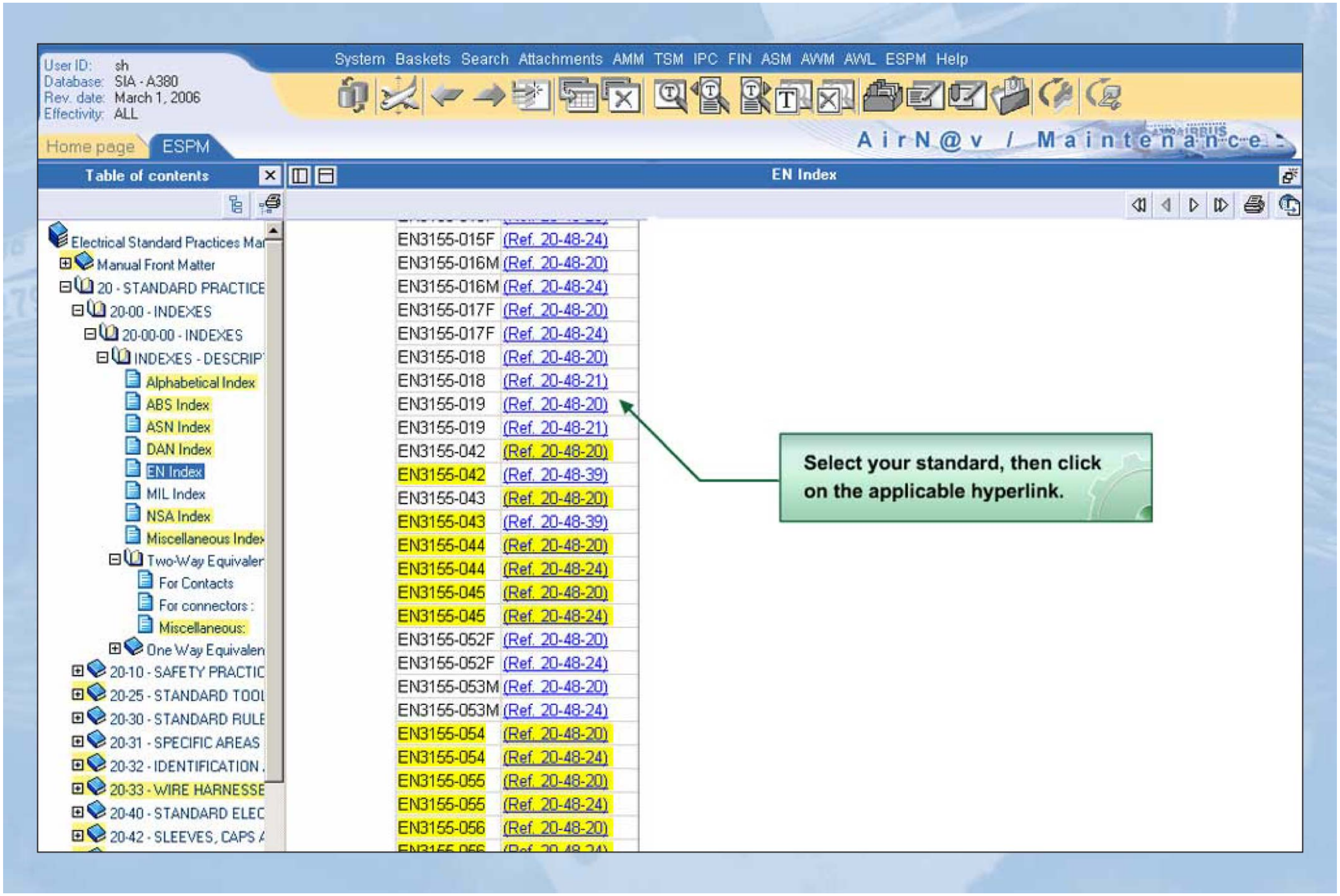
CHAPTER 20 STRUCTURE / OVERVIEW

AIRN@V SEARCH IN ESPM (continued)

Link between AWL & ESPM



AIRN@V SEARCH IN ESPM - LINK BETWEEN AWL & ESPM



AIRN@V SEARCH IN ESPM - LINK BETWEEN AWL & ESPM

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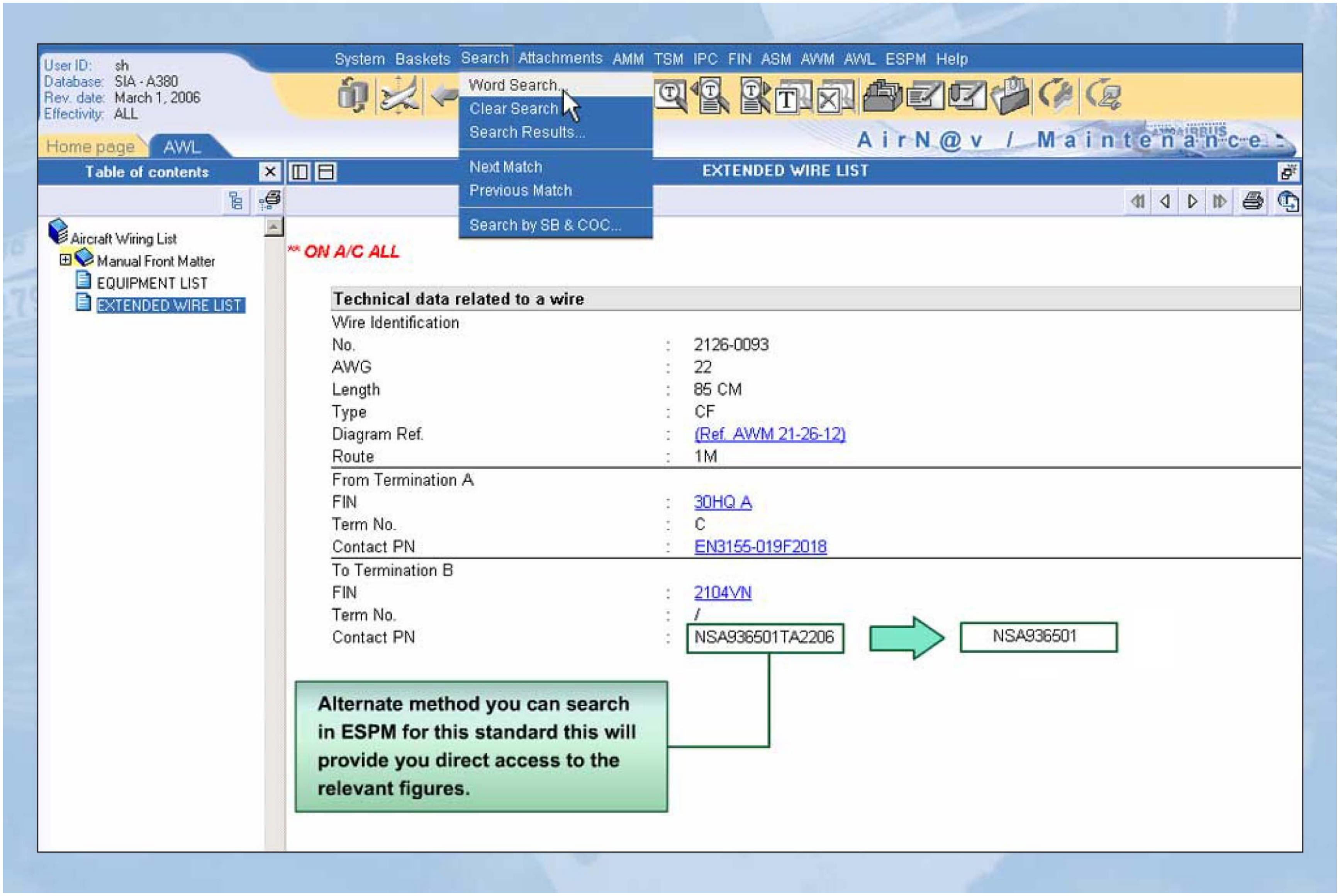
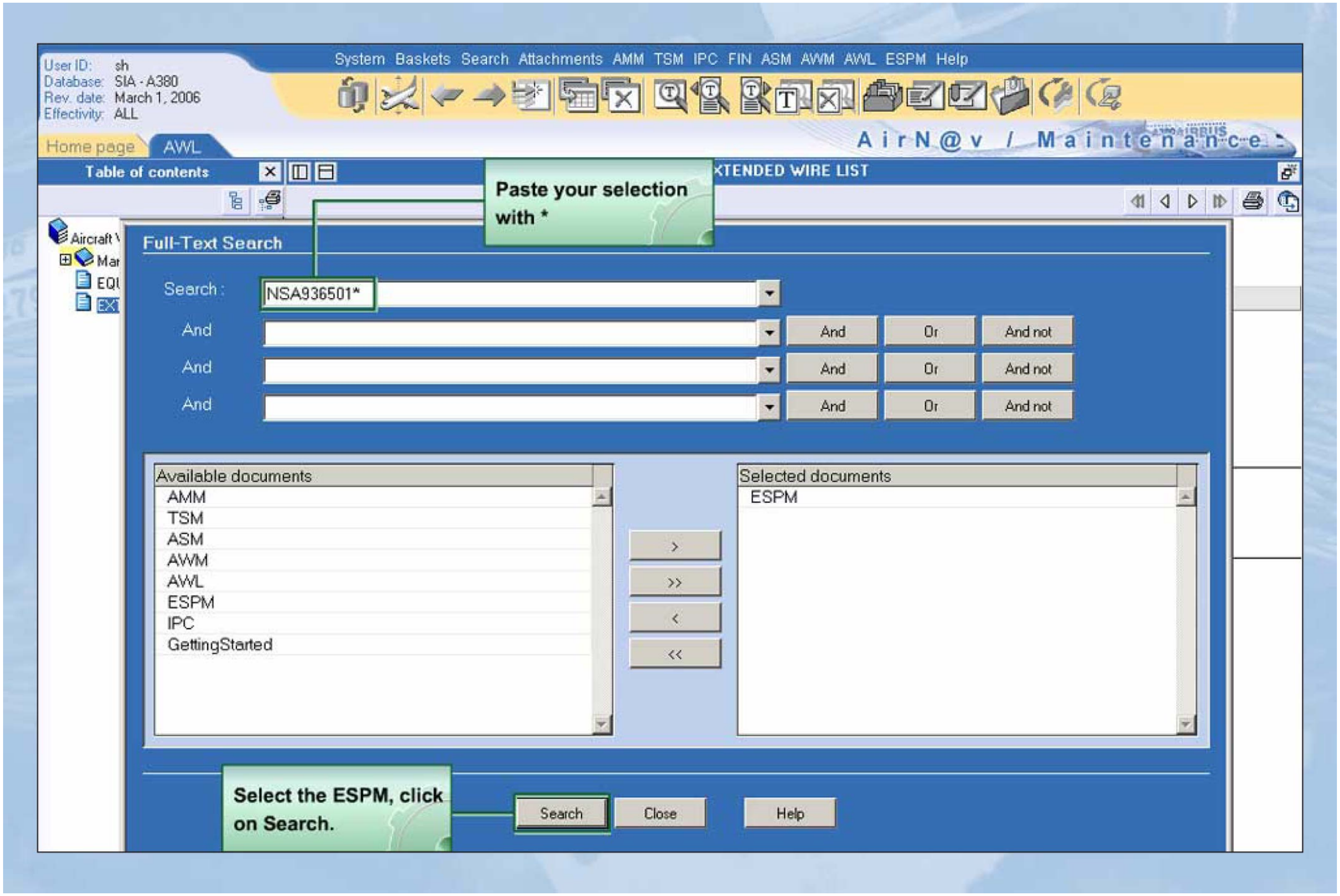
AIRN@V SEARCH IN ESPM (continued)

Use of "word search" in ESPM

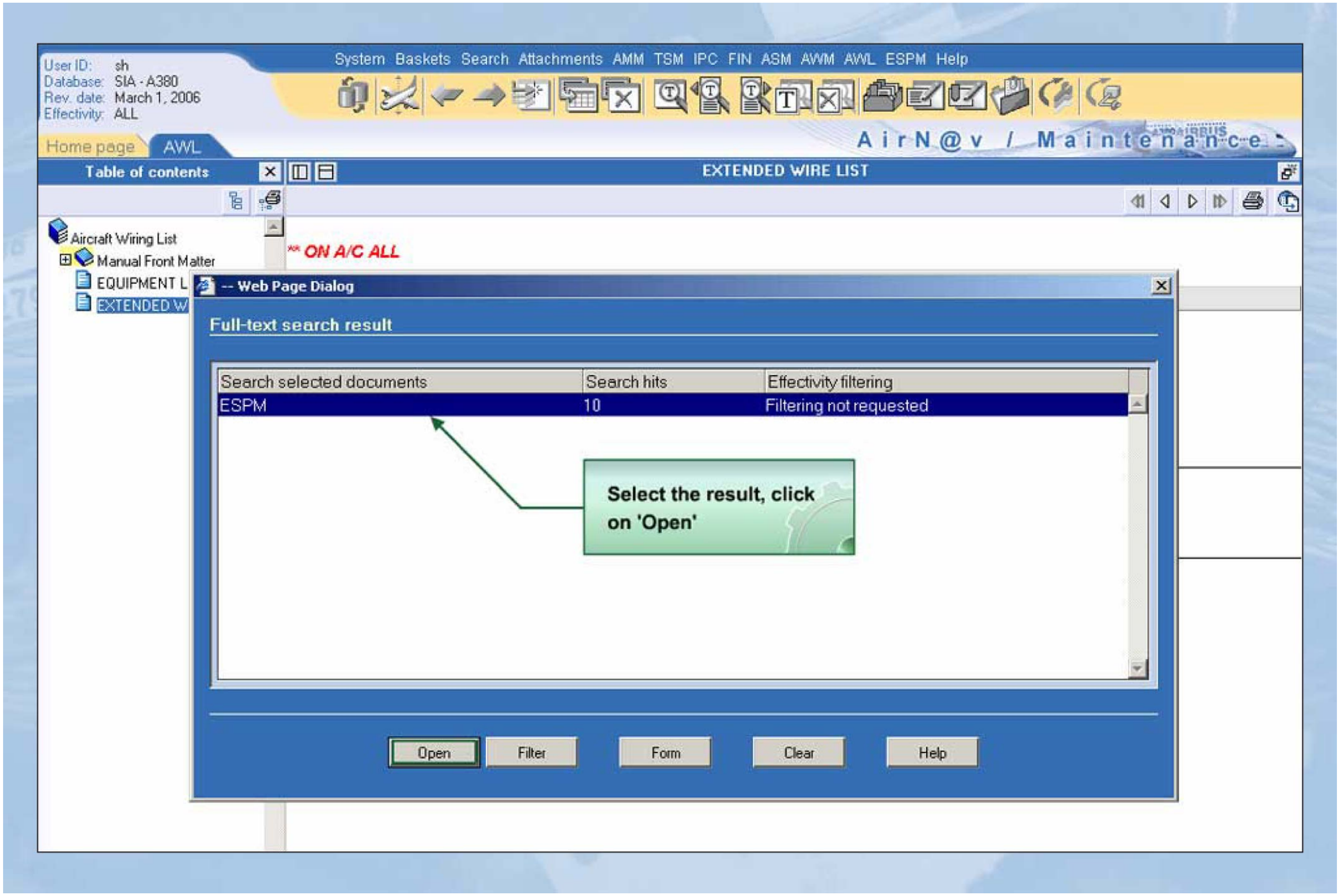
X8U08481 - X0332T0 - XM2008000000001



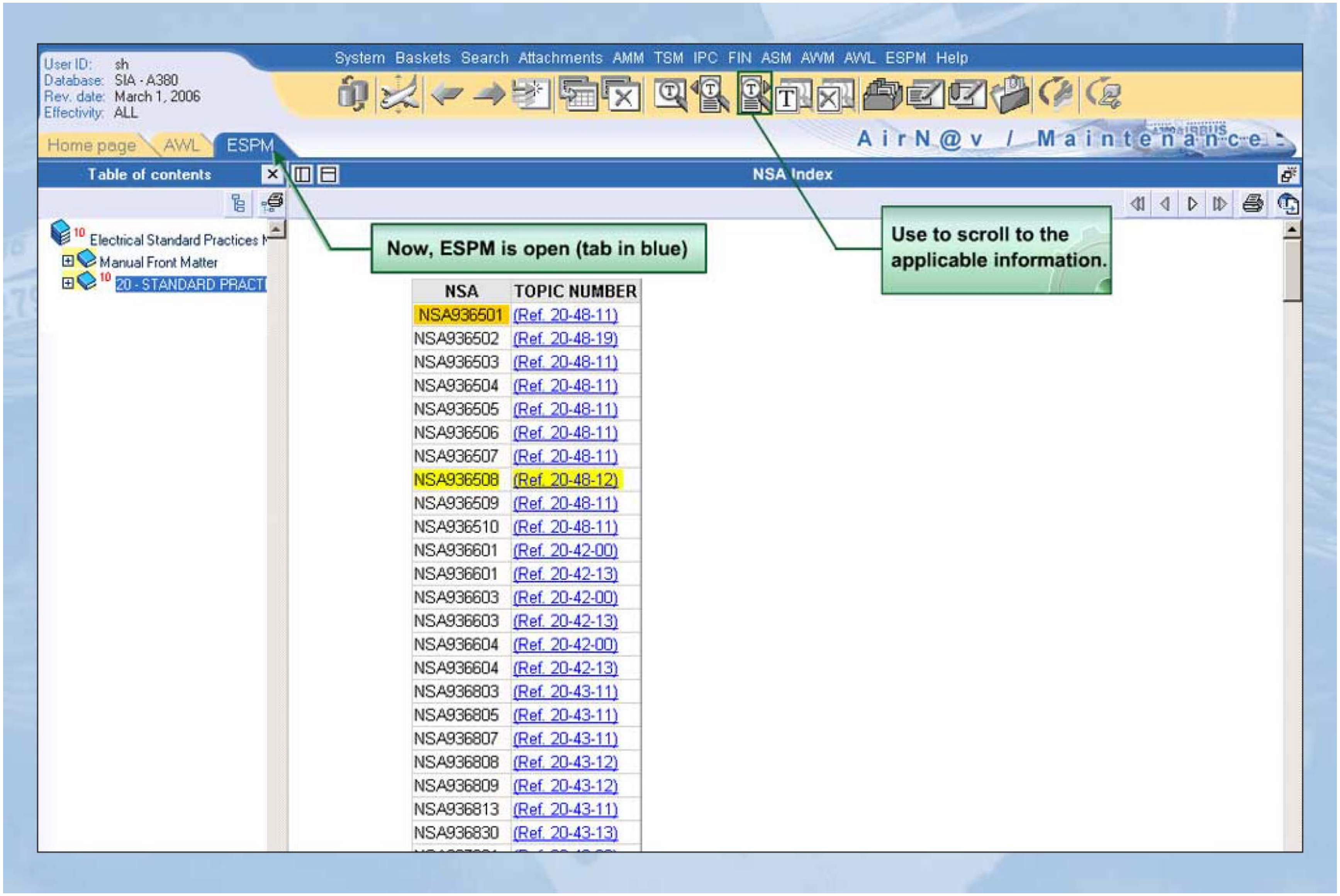
AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM



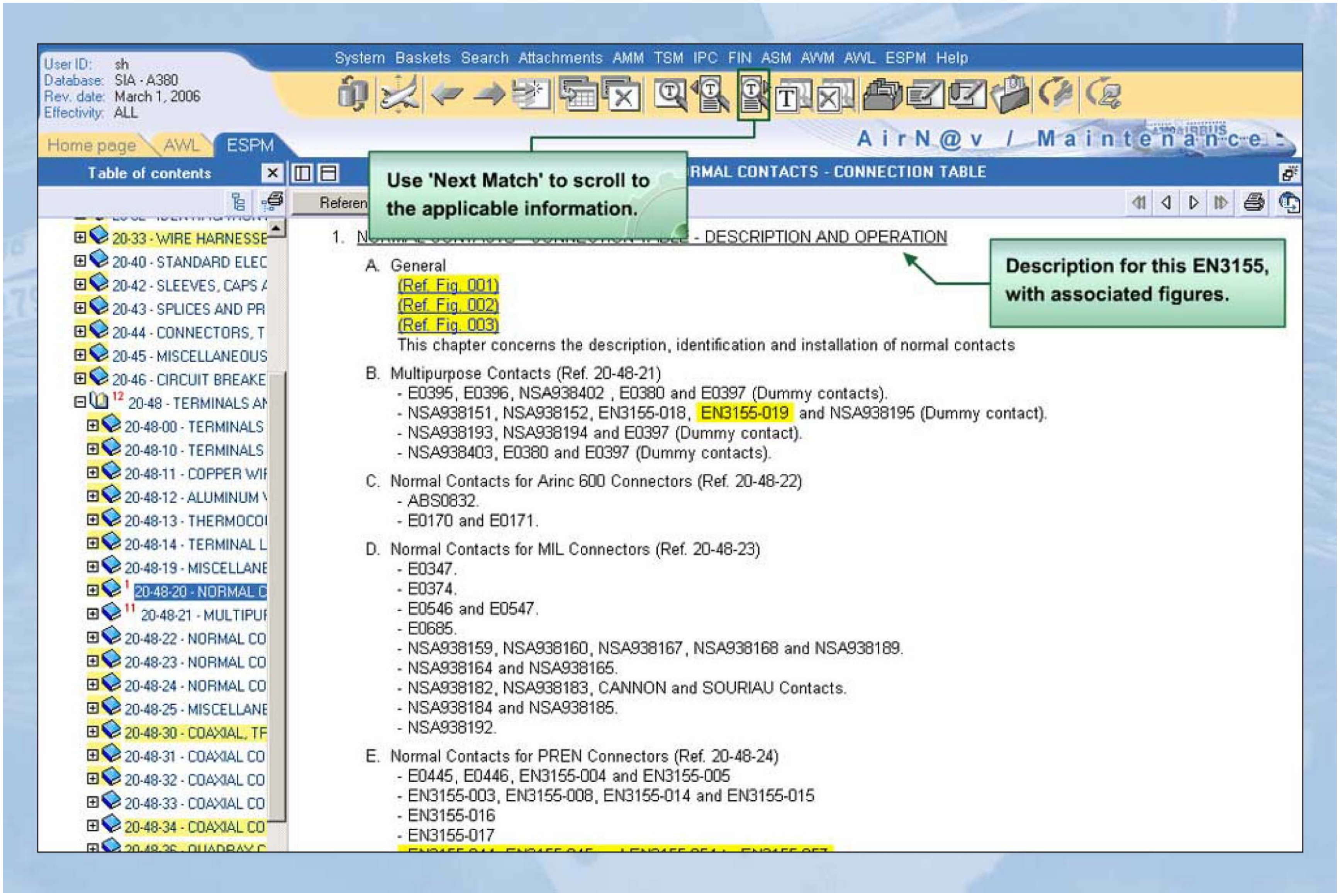
AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM



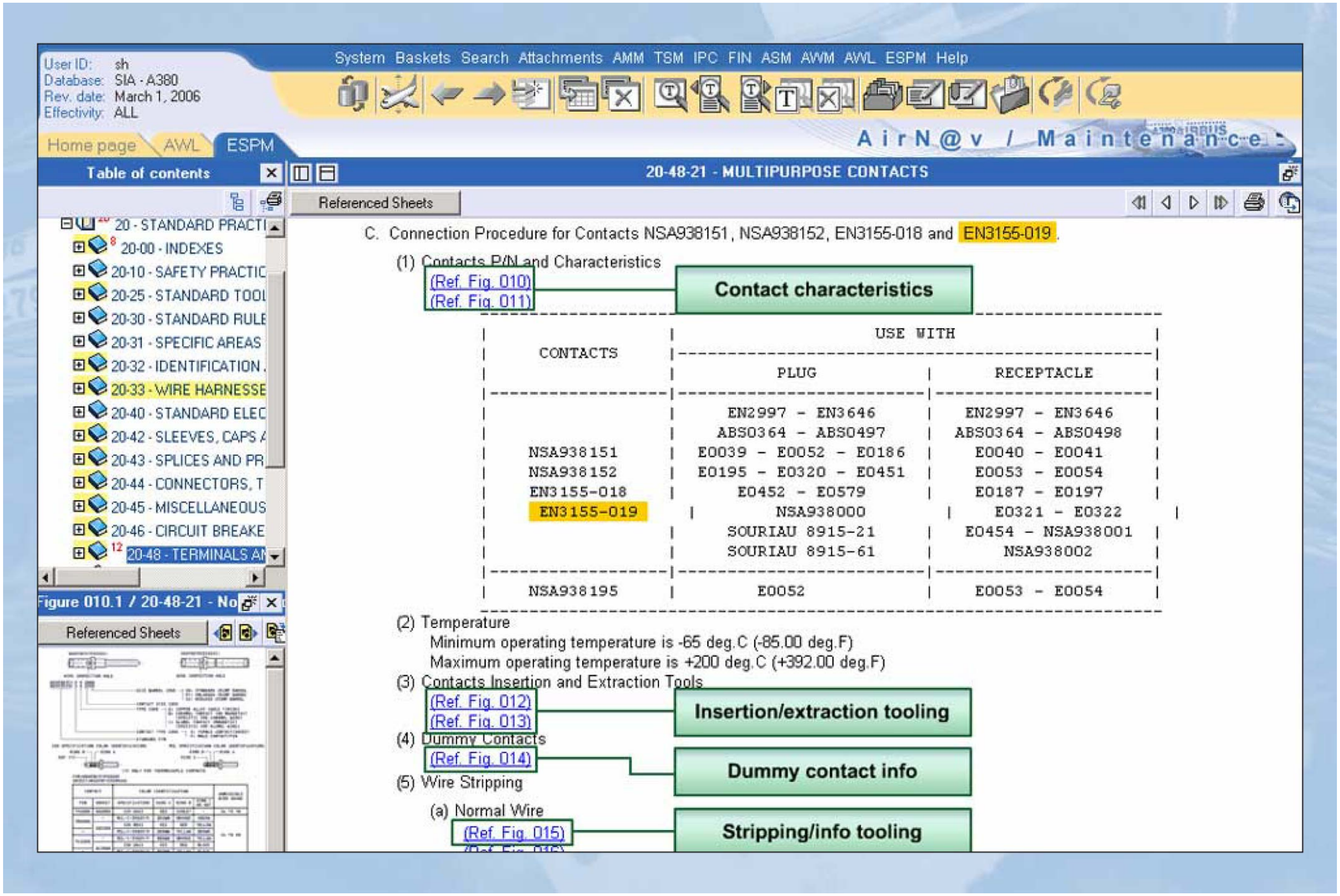
AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM



AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

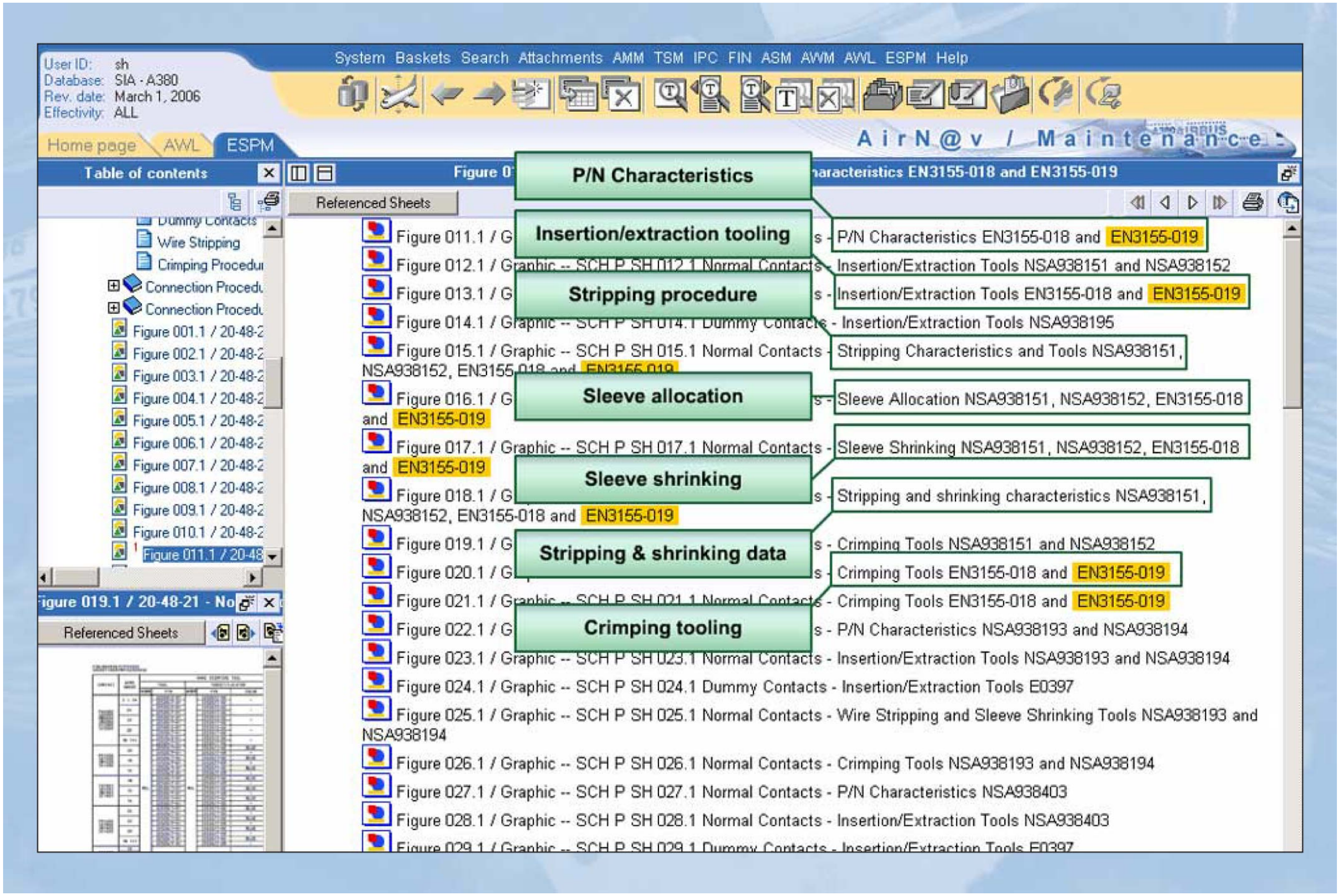


AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

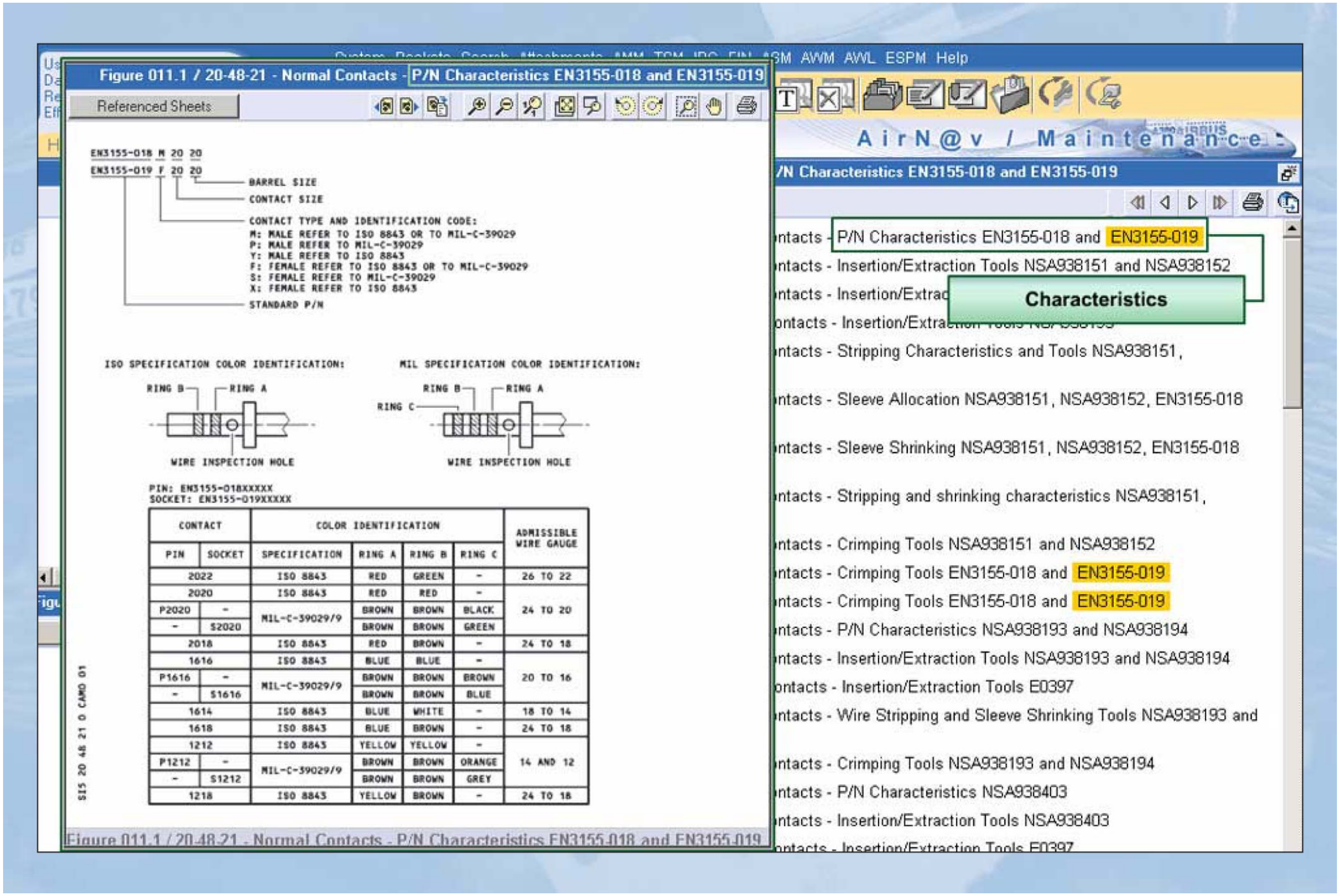


AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

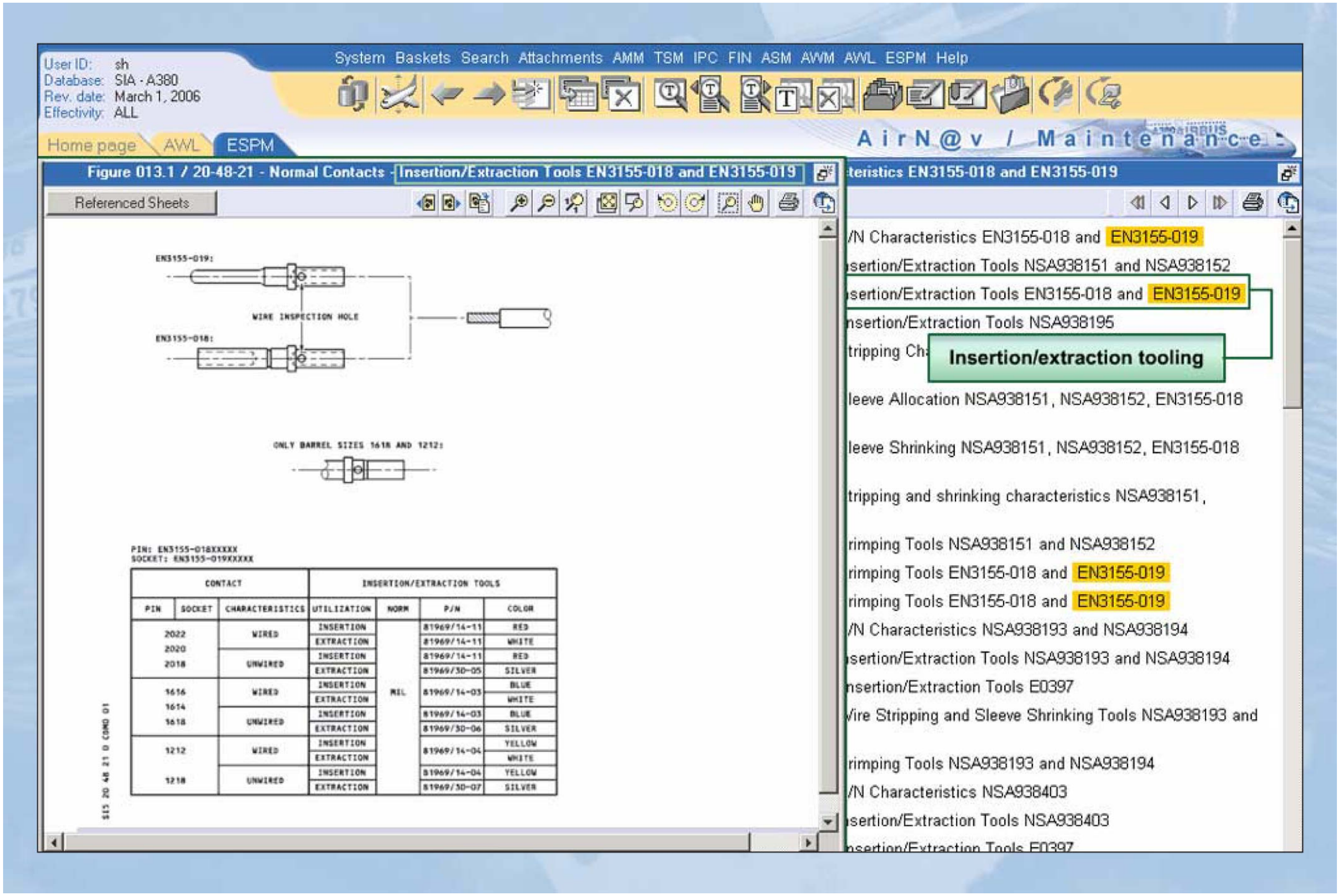
X8U08481 - X0332T0 - XM2008000000001



AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

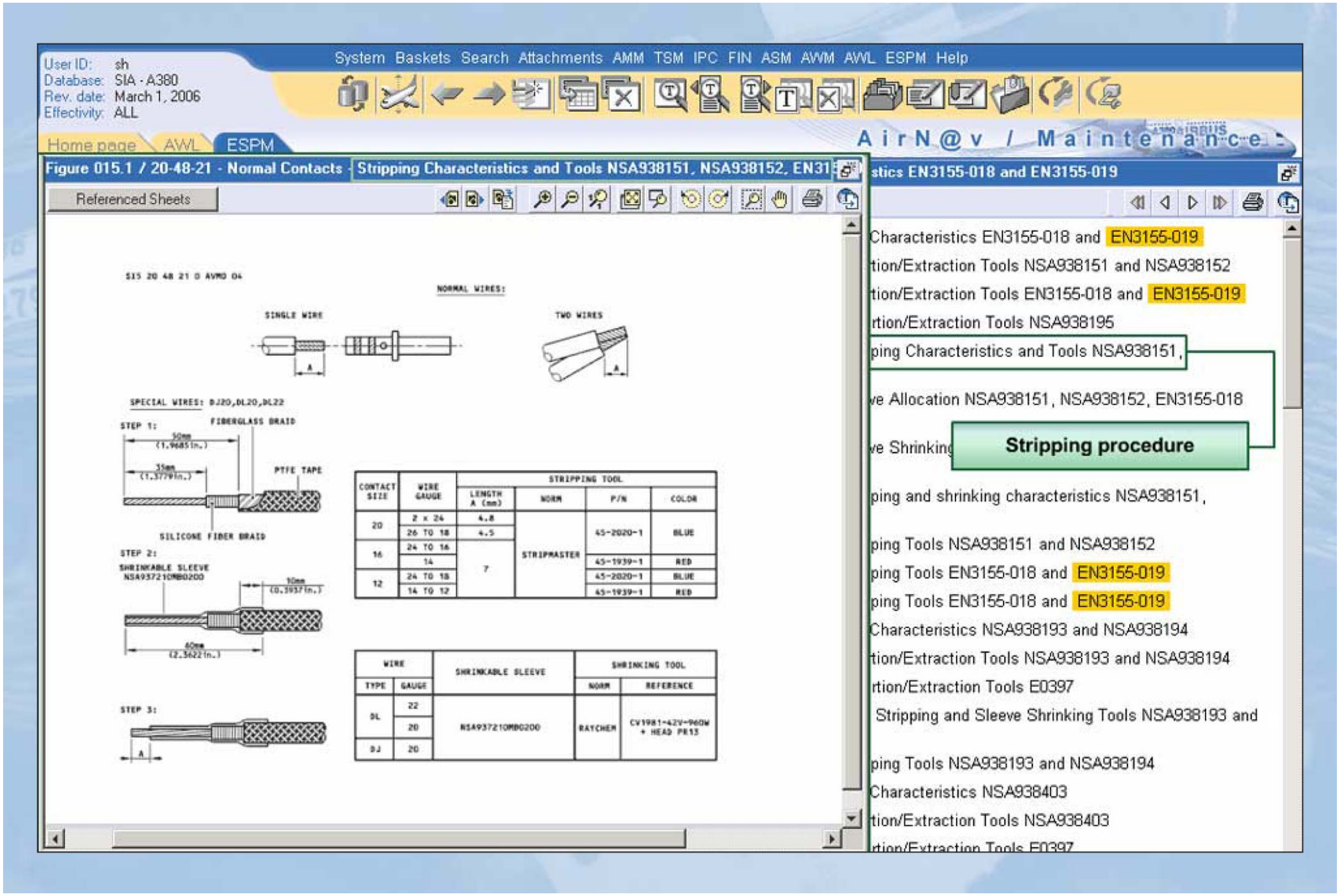


AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM



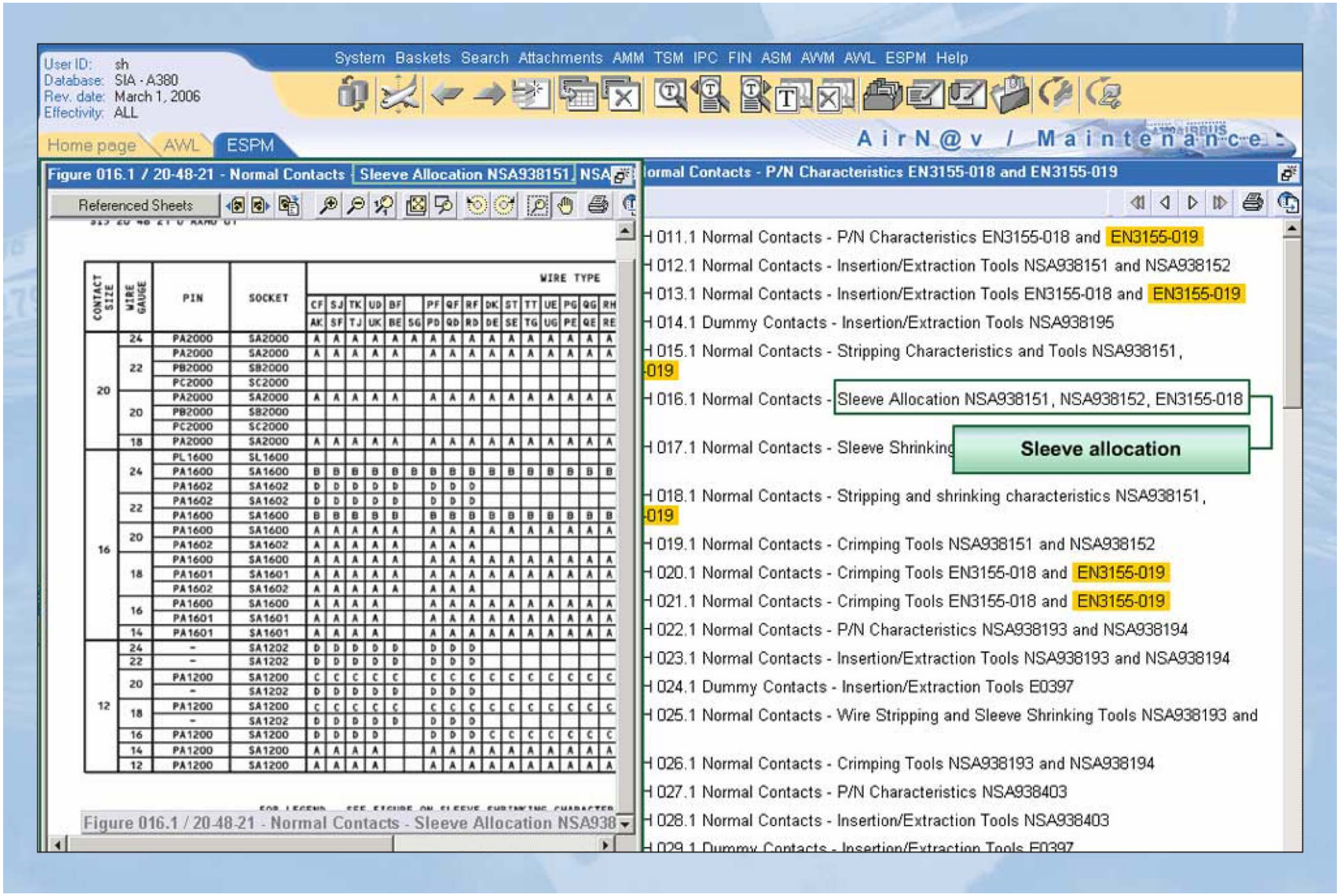
AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

X8U08481 - X0332T0 - XM2008000000001

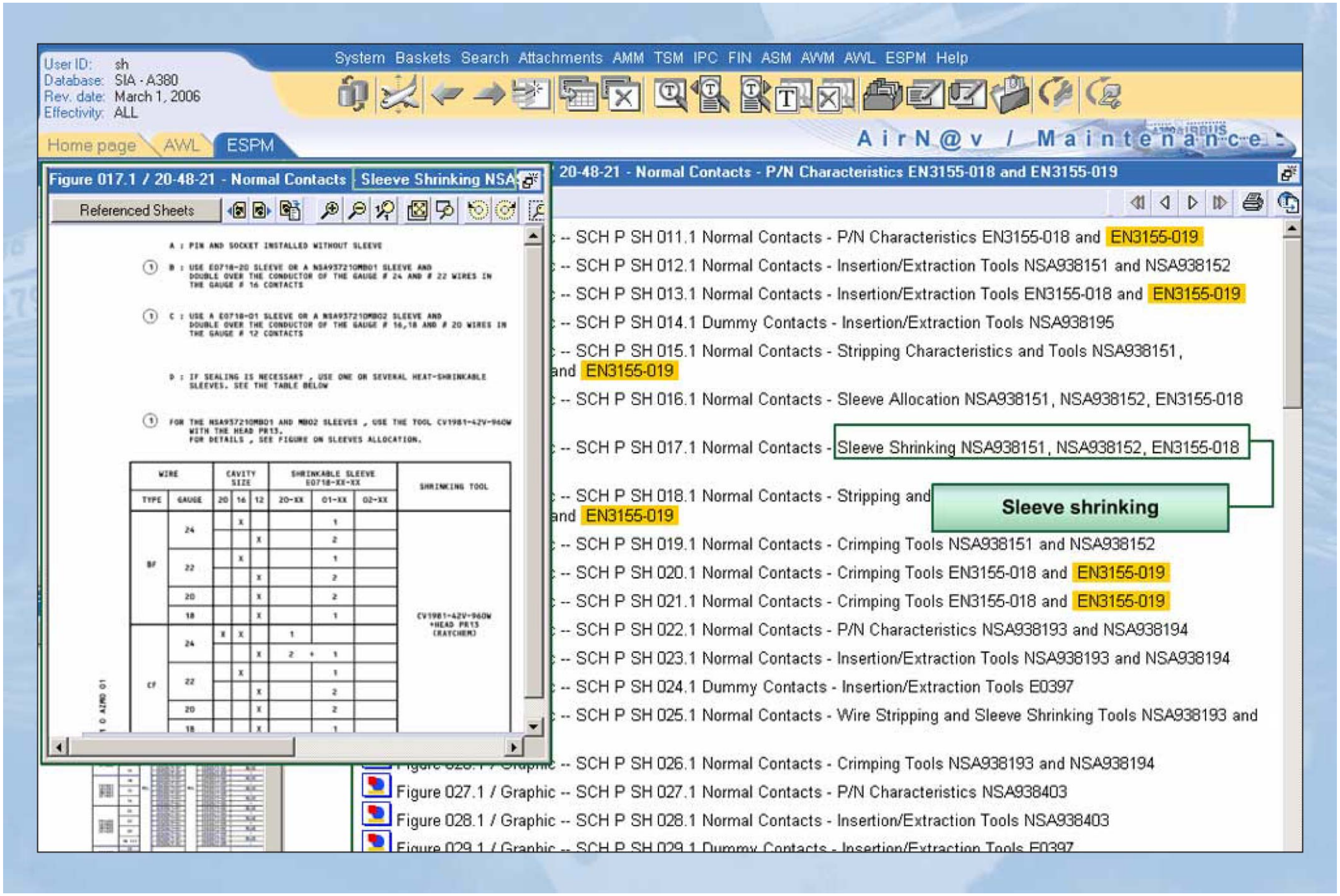


AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

X8U08481 - X0332T0 - XM2008000000001

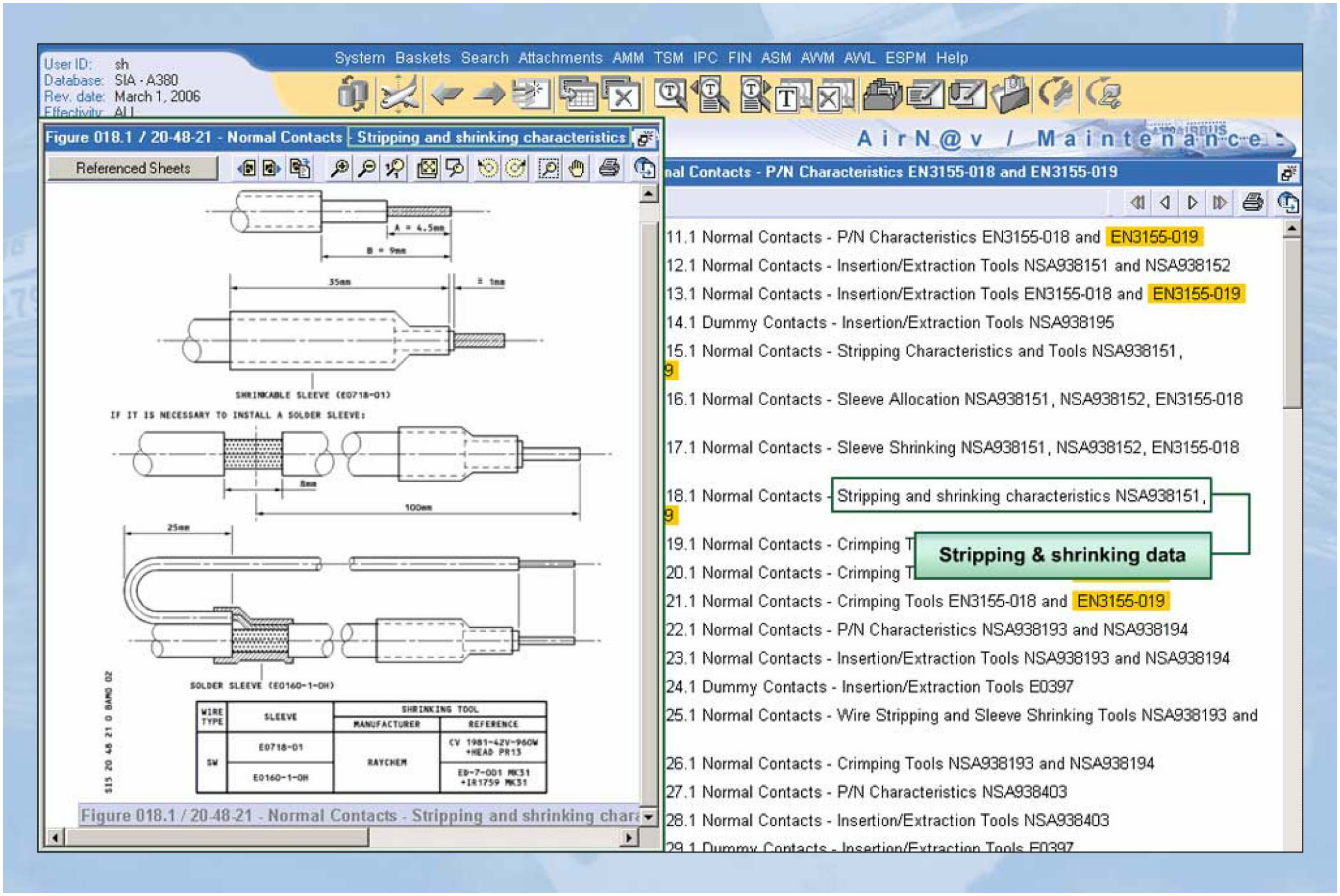


AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM



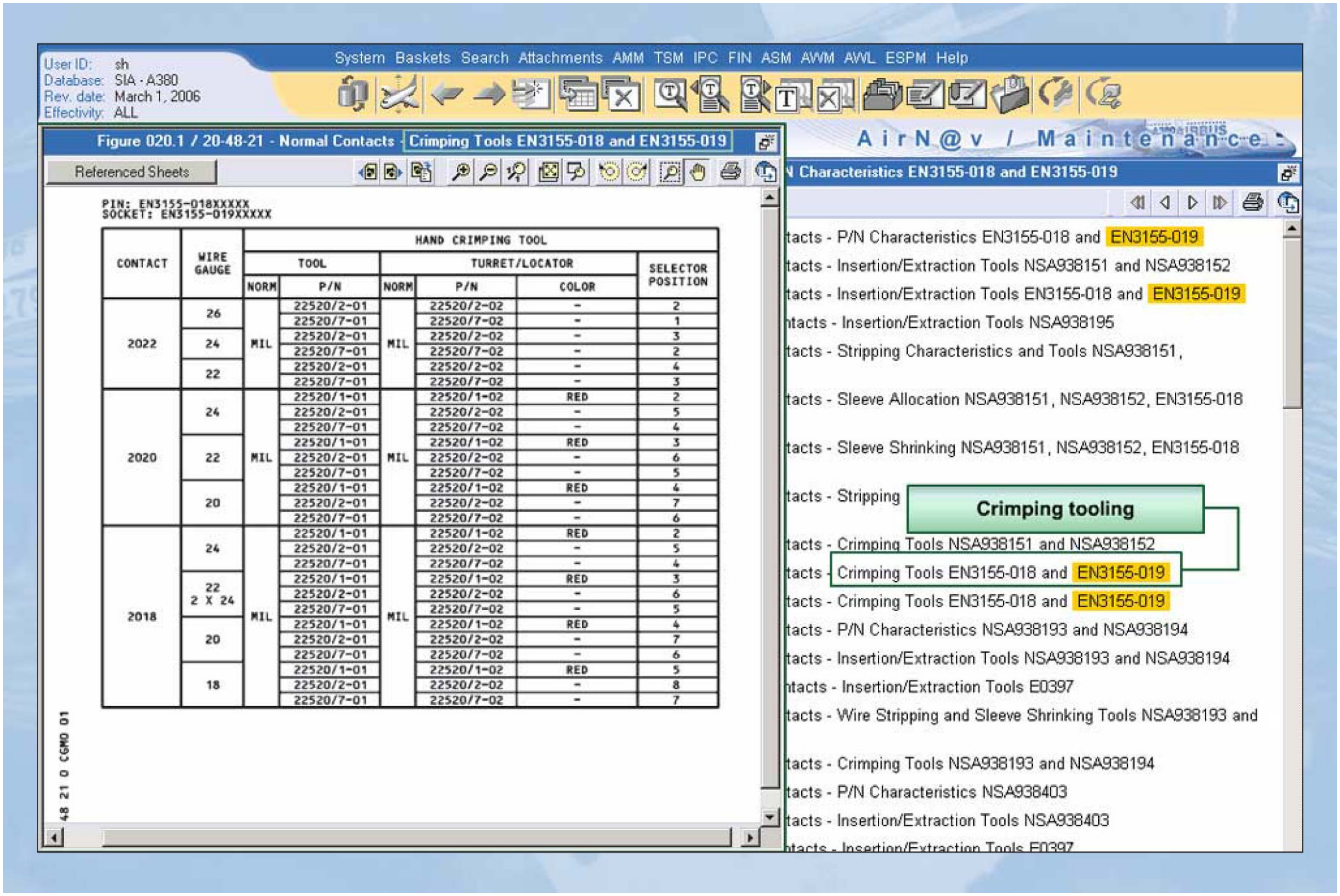
AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

X8U08481 - X0332T0 - XM2008000000001



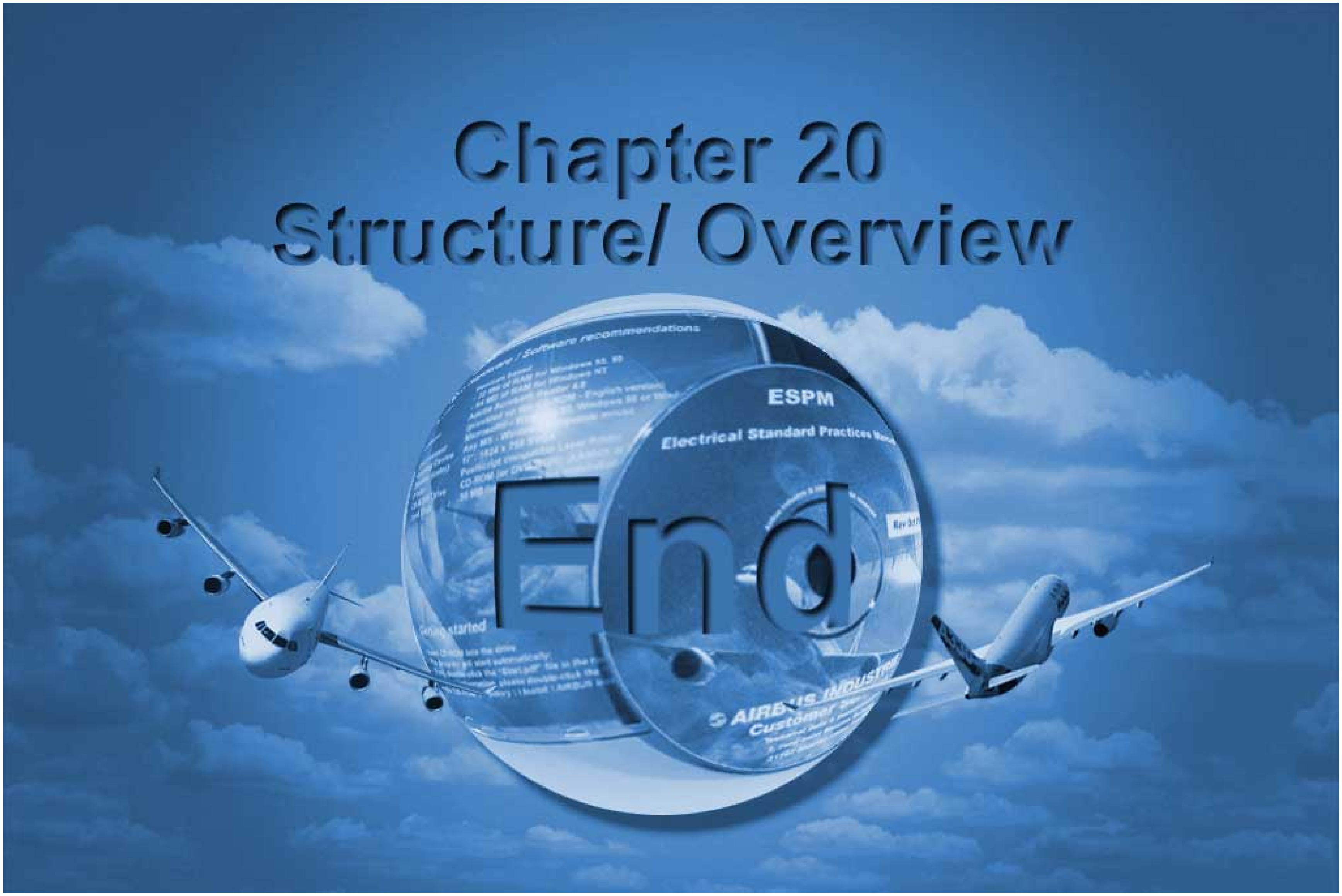
AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

X8U08481 - X0332T0 - XM2008000000001



CONTACT	WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
2022	26	MIL	22520/2-01	MIL	22520/2-02	-	2
			22520/7-01		22520/7-02	-	1
	24		22520/2-01		22520/2-02	-	3
			22520/7-01		22520/7-02	-	2
	22		22520/2-01		22520/2-02	-	4
			22520/7-01		22520/7-02	-	3
2020	24	MIL	22520/1-01	MIL	22520/1-02	RED	2
			22520/2-01		22520/2-02	-	5
			22520/7-01		22520/7-02	-	4
	22		22520/1-01		22520/1-02	RED	3
			22520/2-01		22520/2-02	-	6
			22520/7-01		22520/7-02	-	5
	20		22520/1-01		22520/1-02	RED	4
			22520/2-01		22520/2-02	-	7
			22520/7-01		22520/7-02	-	6
2018	24	MIL	22520/1-01	MIL	22520/1-02	RED	2
			22520/2-01		22520/2-02	-	5
			22520/7-01		22520/7-02	-	4
	22 2 X 24		22520/1-01		22520/1-02	RED	3
			22520/2-01		22520/2-02	-	6
			22520/7-01		22520/7-02	-	5
	20		22520/1-01		22520/1-02	RED	4
			22520/2-01		22520/2-02	-	7
			22520/7-01		22520/7-02	-	6
	18		22520/1-01		22520/1-02	RED	5
			22520/2-01		22520/2-02	-	8
			22520/7-01		22520/7-02	-	7

AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM



AIRN@V SEARCH IN ESPM - USE OF "WORD SEARCH" IN ESPM

CHAPTER CROSS-REFERENCE INDEX

CHAPTER CROSS-REFERENCE INDEX

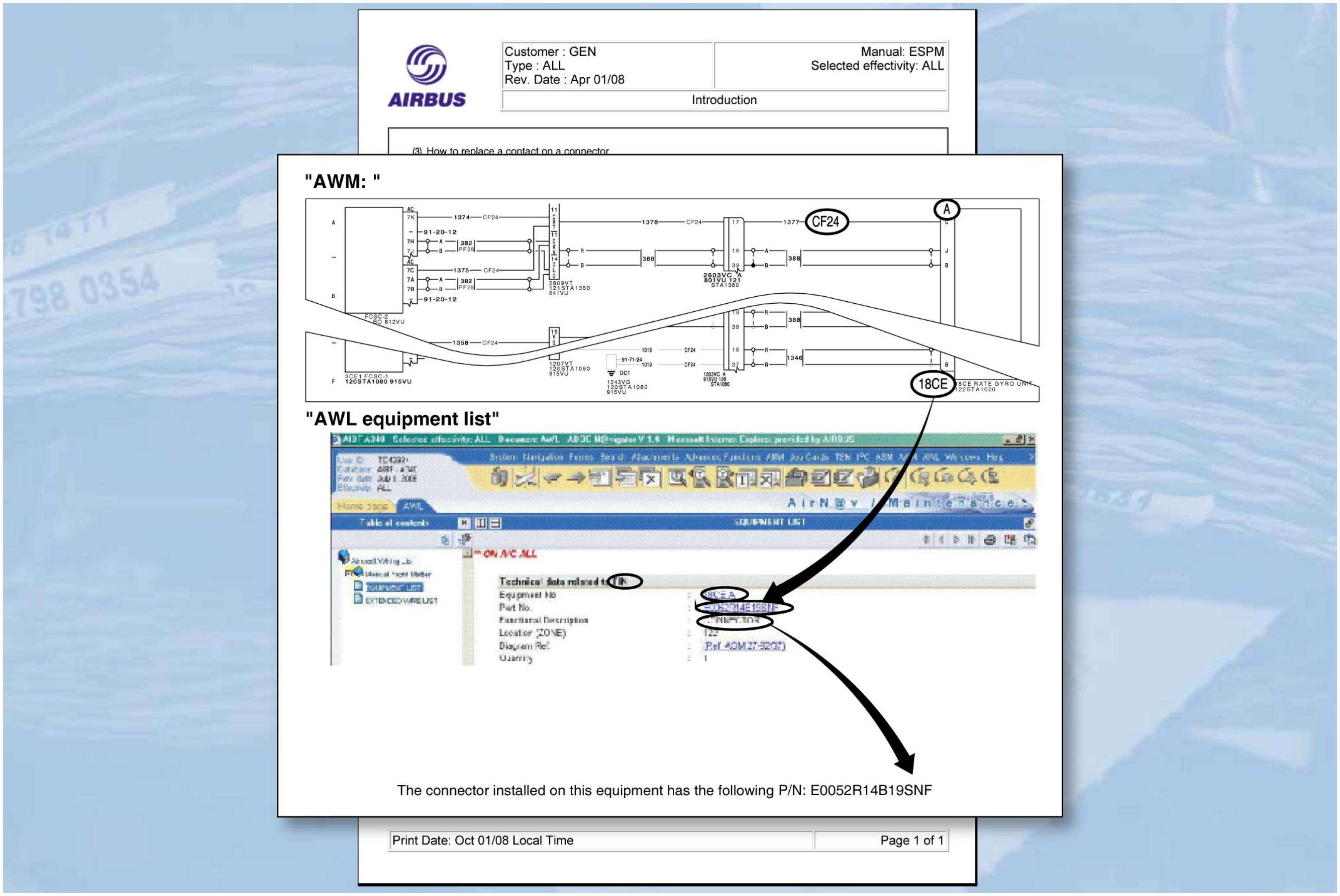
In this module we will explain you how to find information in the ESPM.
As a concrete example: let's suppose you have to replace a contact on a connector.
The following information is available.
The connector functional identification number (F.I.N) is known from the aircraft itself.
The wire type and gauge are known from the Aircraft Wiring Manual (AWM).
You have consequently to note the wire type CF24.
And via the Aircraft Wiring List (AWL), you note that the FIN 18CE is a connector type E0052R14B19SNF.
Now you must define the contact part number and select the appropriate part number for the insertion/extraction tool and, crimping tool.
Consequently you have to consult the index of the ESPM for your E0052 connector.
The index indicates that the information concerning this connector is depicted in the 20-44-11 chapter.
In this chapter section subject, with the full connector part number you have noted, you access the contact arrangement figure and you know there is 19 contact size 20.
Now, at the end of this 20-44-11 chapter you have a connection table, which gives you the part number of the contact used.
Here we select the socket contact because in the full connector PN the S indicates that is a socket contact. All data for this contact are located in 20-48-21 chapter.
Now in the 20-48-21 you can define the complete contact part number when you have the following information.
Contact part number NSA938152SXXXX socket type, wire gauge and, contact size 20.
You have to correlate in the table this information to have the complete contact part number.
In the table that follows with you full contact part number; you can select the insertion/extraction tools.
The stripping characteristics and tool.
And finally the crimping tools.
If you need further information for these tools, you can consult the miscellaneous index.
The index brings you in the tool chapter where the tools are represented.
Consulting the tooling chapter can be useful. For example, for the insertion/extraction tools, the PNs, given in the various table, have some equivalence with other tools PN.
Now suppose we have to search an information in the ESPM by word.
For example, before working in the aircraft you have to protect a connector. Word protection normally comes in mind.
Select protection in the alphabetical index.
The indicated chapter gives you information on the various PNs of caps you can use to protect the connectors depending on the type of connector.
All the necessary details are given in the relevant pages.
For example, protective caps for rectangular connectors.
As another example, you have to solder a contact and you want to remind you the typical method. You have consequently to select the word soldering in the alpha index.
As you can see, this chapter gives you all the precautions to be followed during a soldering operation.
A typical procedure with the relevant illustration, for desoldering.
Soldering with the wire preparation.
And the wire connection. For information there is also typical defects.

CHAPTER CROSS-REFERENCE INDEX

HOW TO REPLACE A CONTACT ON A CONNECTOR

CHAPTER CROSS-REFERENCE INDEX

X8U08481 - X0332T0 - XM2009000000001



CHAPTER CROSS-REFERENCE INDEX

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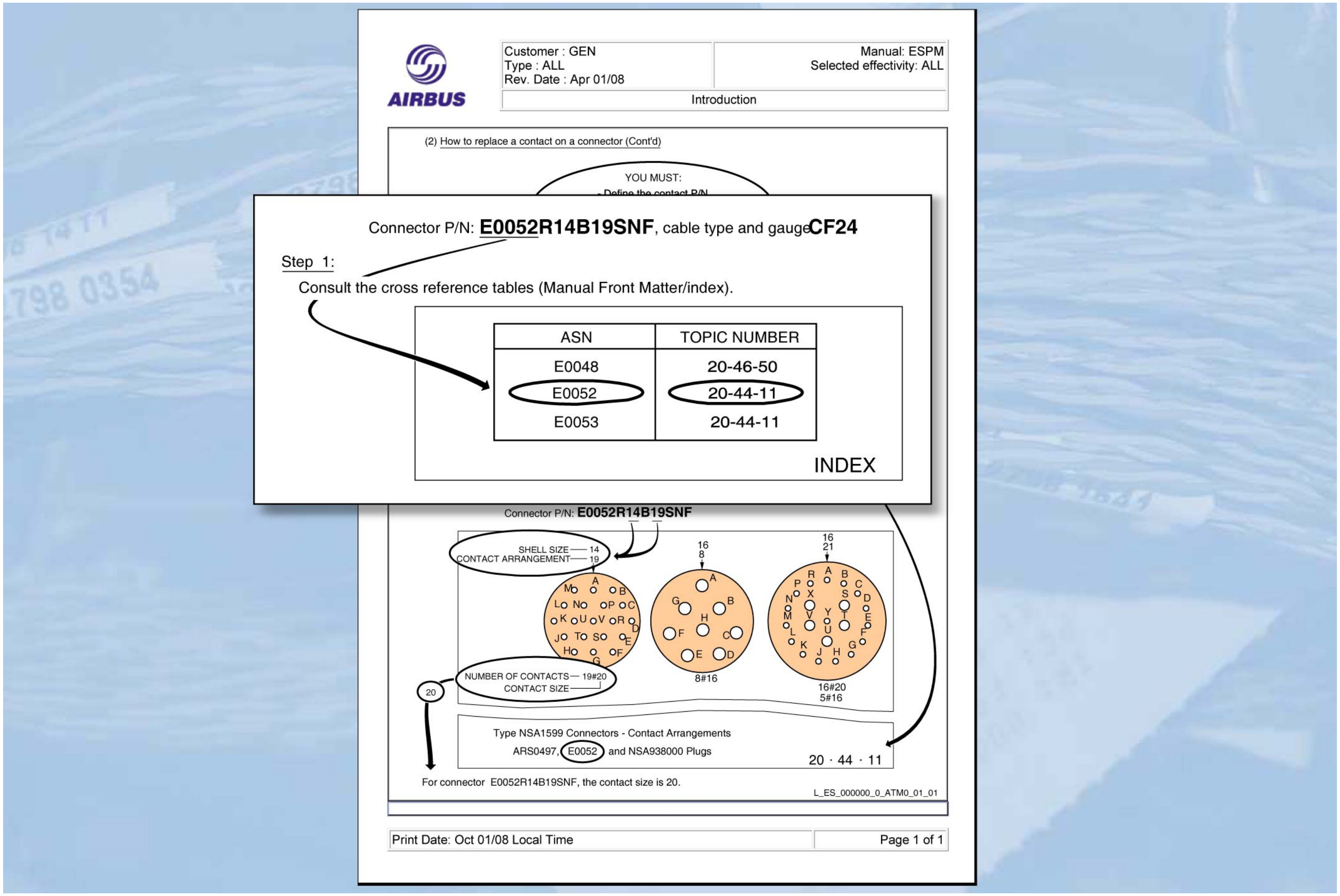
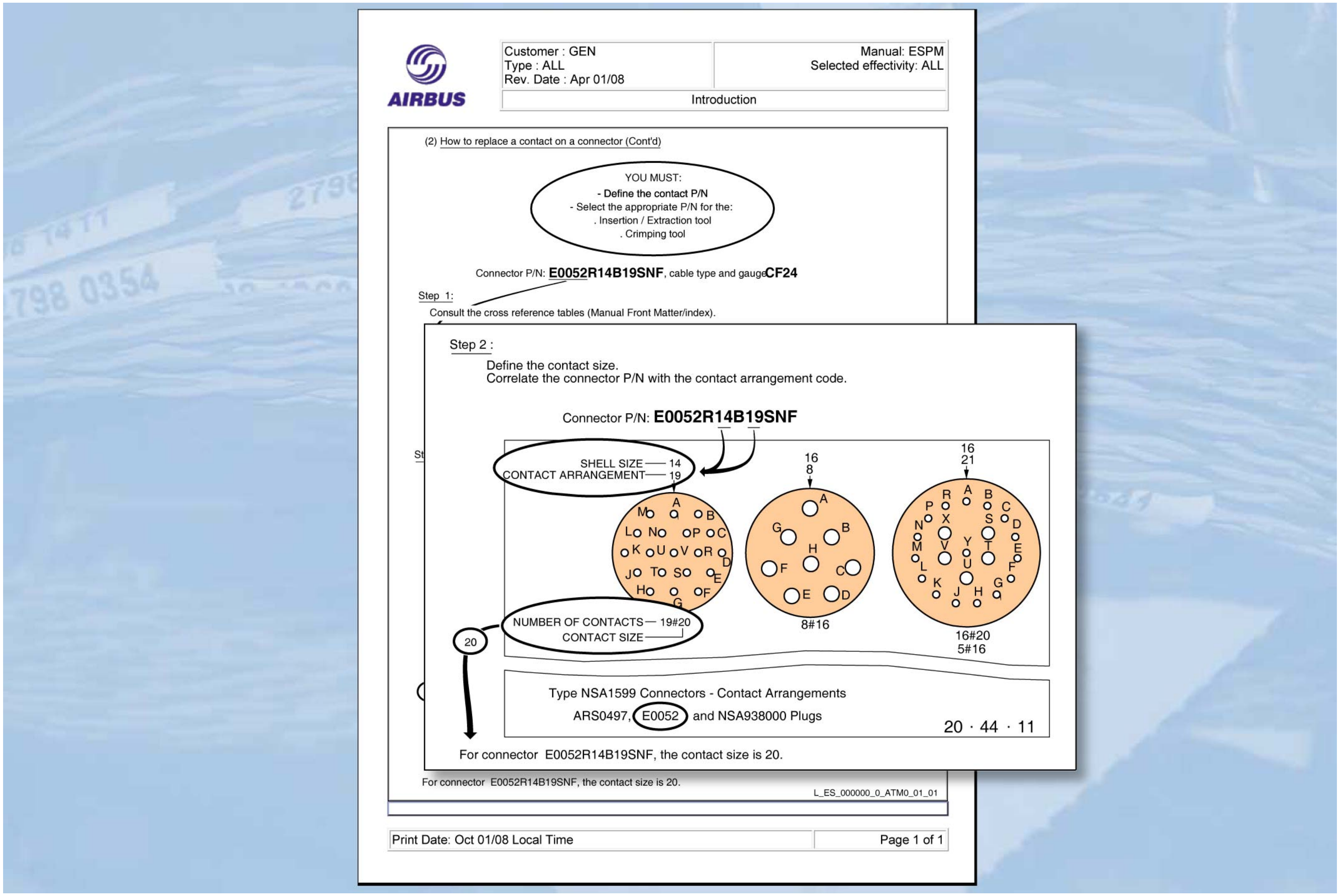


CHAPTER CROSS-REFERENCE INDEX



CHAPTER CROSS-REFERENCE INDEX

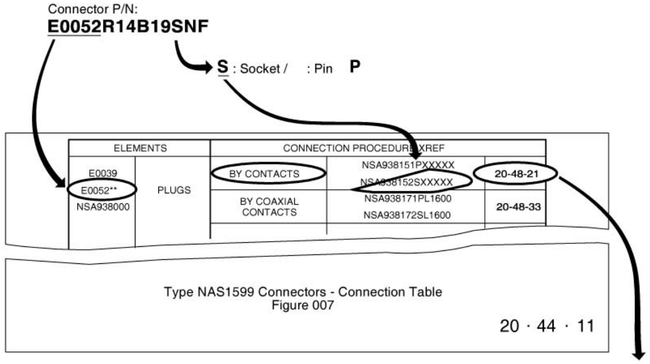
X8U08481 - X0332T0 - XM2009000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Introduction	

(2) How to replace a contact on a connector (Cont'd)

Step 3 :

Define the contact standard P/N.
Correlate the connector P/N with the appropriate contact type in the connection table which appears in the last page of the chapter.



Type NAS1599 Connectors - Connection Table
Figure 007
20 · 44 · 11

The contact standard P/N is NSA938152SXXXXX.
Data related to this contact is contained in 20-48-21.

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X8U08481 - X0332T0 - XM2009000000001

CHAPTER CROSS-REFERENCE INDEX

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Introduction	

(2) How to replace a contact on a connector (cont'd)

Step 4:

Define the complete contact P/N when you have the following information:

- Topic to consult: **20-48-21**.
- Contact standard P/N: **NSA938152SXXXXX. (Socket type)**
- Cable type and gauge: **CF24**.
- Contact size: **20**.

Correlate the above information to select the appropriate contact suffix.

Contact P/N to be completed with the suffix in the table to make up the full P/N.

A: Copper alloy type (gold finish).
B: specific for Chromel cable type
C: specific for Alumel cable type

SOCKET: NSA938152SXXXXX

CONTACT SIZE

CONTACT		COLOR IDENTIFICATION				ADMISSIBLE CABLE GAUGE
PIN	SOCKET	SPECIFICATION	RING A	RING B	RING C OR DOT	
PA2000	SA2000	ISO 8843	RED	VIOLET	-	24 TO 18
[illegible]		MIL-C-39029/9	BROWN	ORANGE	GREEN	
	SB2000	ISO 8843	RED	RED	YELLOW	
PA1600	SA1600	ISO 8843	BLUE	BLUE	-	20 TO 16
-	SB1600	MIL-C-39029/9	GREEN	RED	RED	
-	SC1600	MIL-C-39029/9	GREEN	RED	BROWN	
PA1601	SA1601	ISO 8843	BLUE	ORANGE	-	18 TO 14
PA1602	SA1602	ISO 8843	BLUE	VIOLET	-	24 TO 18
-	SB1602	ISO 8843	BLUE	RED	YELLOW	24 TO 20
-	SC1602	ISO 8843	BLUE	RED	BLACK	
PA1200	SA1200	ISO 8843	YELLOW	YELLOW	-	14 AND 12
-	SA1202	ISO 8843	YELLOW	VIOLET	-	24 TO 18

Normal Contacts - P/N Characteristics

NSA938151 AND NSA938152

20 · 48 · 21

For connector E0052 with CF24 cable type and gauge, the complete contact P/N (Socket type) is NSA938152SA2000.
The steps 2, 3 & 4 are not necessary since the complete contact P/N is provided in the hook-up lists of the AWL. (entry point: Connector FIN)

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CHAPTER CROSS-REFERENCE INDEX

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Introduction	

(2) How to replace a contact on a connector (cont'd)

Step 5:

Define the insertion/extraction tool P/N when you have the following information:

- Contact P/N: **NSA938152SA2000**,
- Contact **WIRED**,

Correlate the contact P/N and the applicable characteristics (wired in the present case) in the table to obtain the tool P/N.

SOCKET: NSA938152SXXXXX

CONTACT			INSERTION/EXTRACTION TOOLS		
PIN	SOCKET	CHARACTERISTICS	NORM	P/N	COLOR
PA2000	SA2000	WIRED	MIL	81969/14-02	RED/WHITE
		UNWIRED	MIL	81969/30-05	RED/SILVER
PB2000	SB2000		SOURIAU	8522-56	RED
			CANNON	CET 20-24	RED
PC2000	SC2000		DEUTSCH	M15571 +105910	RED
PA1600	SA1600	WIRED	MIL	81969/14-03	BLUE/WHITE
-	SB1600	UNWIRED	MIL	81969/30-06	BLUE/SILVER
-	SC1600		SOURIAU	8522-57	BLUE
PA1601	SA1601		CANNON	CET 16-21	BLUE
PA1602	SA1602		DEUTSCH	M15571 +105911	BLUE
-	SB1602				
-	SC1602				
PA1200	SA1200	WIRED	MIL	81969/14-04	YELLOW/WHITE
		UNWIRED	MIL	81969/30-07	YELLOW/SILVER
			SOURIAU	8522-58	YELLOW
-	SA1202		CANNON	CET 12-16	YELLOW
			DEUTSCH	M15571 +105912	YELLOW

Normal Contact - Insertion/Extraction Tools
for NSA938151 and NSA938152

20 · 48 · 21

For wired contact NSA938152SA2000 the Insertion/Extraction tool P/N is **MIL81969/14-02.**

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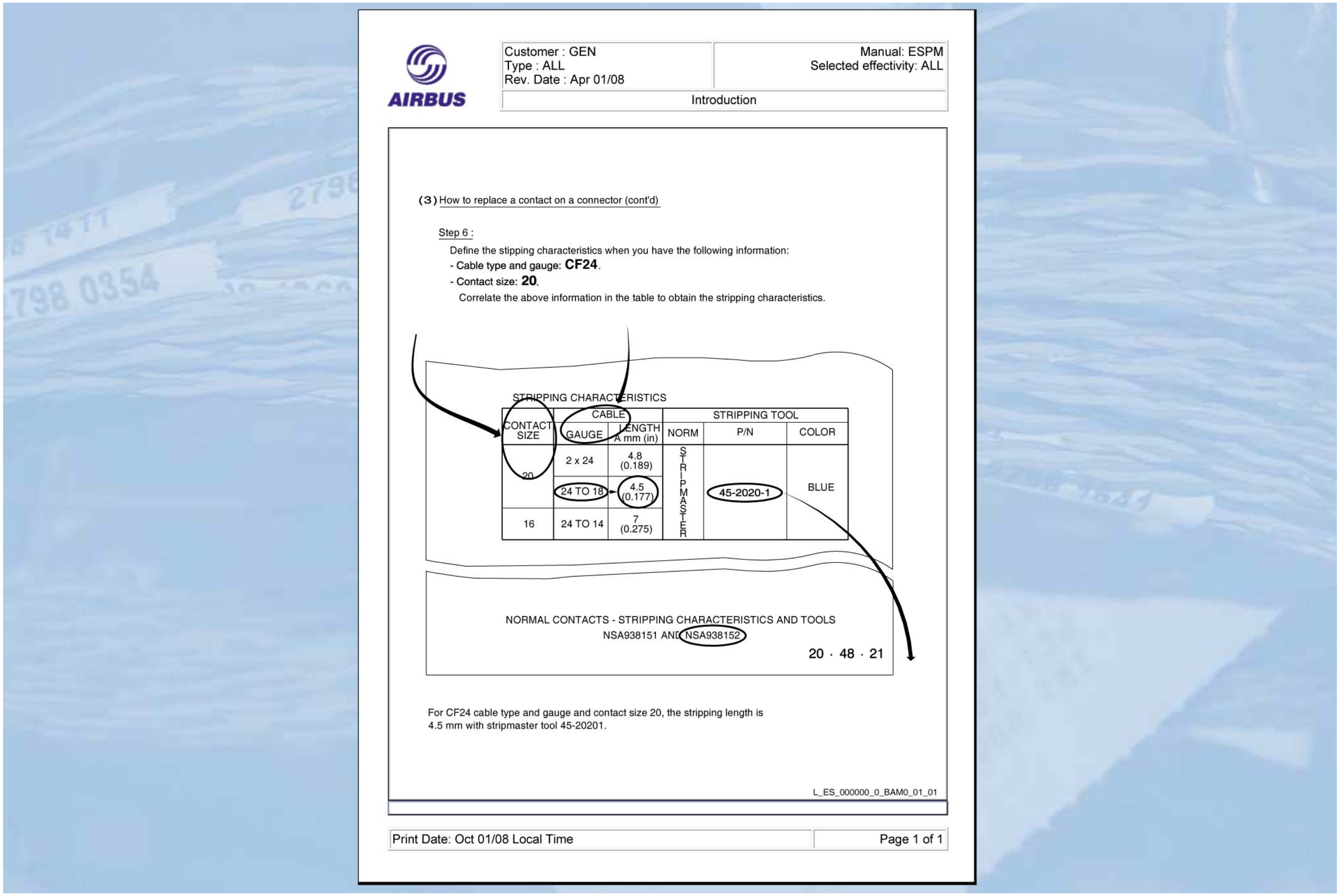
CHAPTER CROSS-REFERENCE INDEX



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Introduction

(3) How to replace a contact on a connector (cont'd)

Step 6 :

Define the stipping characteristics when you have the following information:

- Cable type and gauge: **CF24**.
- Contact size: **20**.

Correlate the above information in the table to obtain the stripping characteristics.

STRIPPING CHARACTERISTICS

CONTACT SIZE	CABLE GAUGE	CABLE LENGTH A mm (in)	STRIPPING TOOL NORM	STRIPPING TOOL P/N	STRIPPING TOOL COLOR
20	2 x 24	4.8 (0.189)	STRIPMASTER	45-2020-1	BLUE
	24 TO 18	4.5 (0.177)			
16	24 TO 14	7 (0.275)			

NORMAL CONTACTS - STRIPPING CHARACTERISTICS AND TOOLS
NSA938151 AND NSA938152

20 · 48 · 21

For CF24 cable type and gauge and contact size 20, the stripping length is 4.5 mm with stripmaster tool 45-20201.

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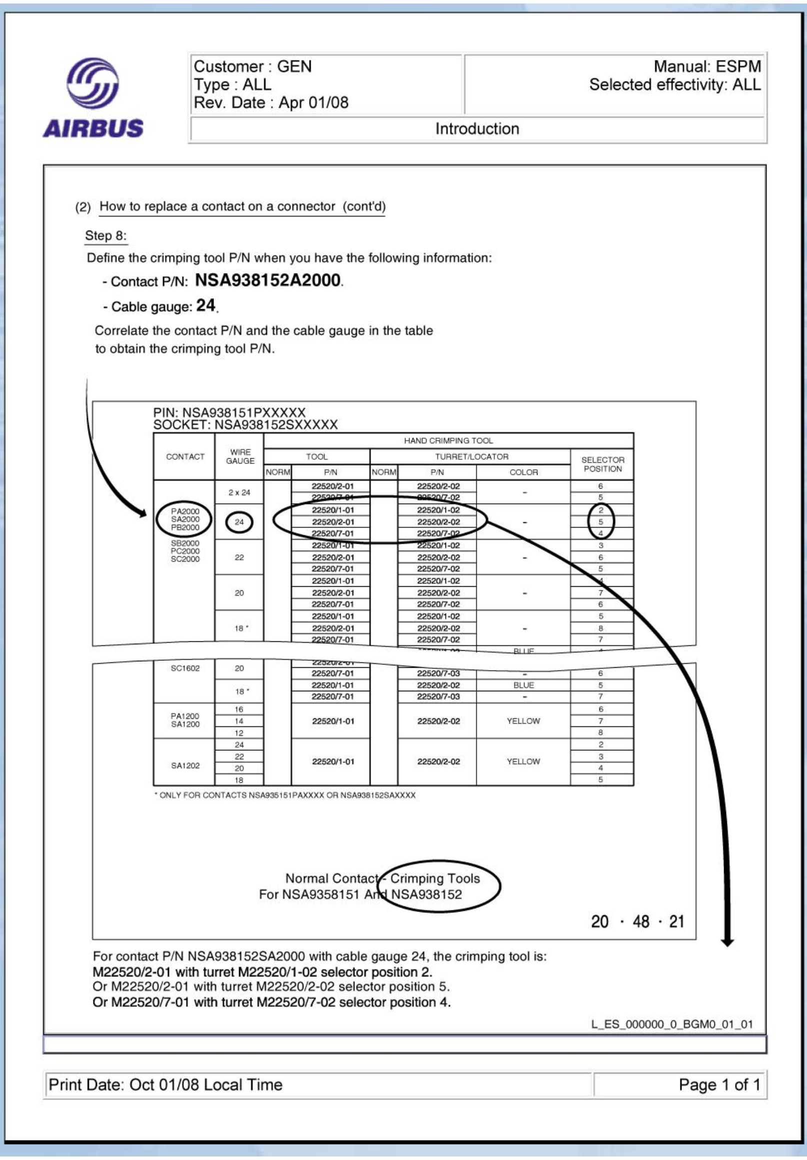
CHAPTER CROSS-REFERENCE INDEX



AIRBUS

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Introduction

(2) How to replace a contact on a connector (cont'd)

Step 8:

Define the crimping tool P/N when you have the following information:

- Contact P/N: **NSA938152A2000**.
- Cable gauge: **24**.

Correlate the contact P/N and the cable gauge in the table to obtain the crimping tool P/N.

PIN: NSA938151PXXXXX
SOCKET: NSA938152SXXXXX

CONTACT	WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
	2 x 24		22520/2-01		22520/2-02	-	6
			22520/7-01		22520/7-02		5
PA2000 SA2000 PB2000 SB2000 PC2000 SC2000	24		22520/1-01		22520/1-02	-	2
			22520/2-01		22520/2-02		5
			22520/7-01		22520/7-02		4
	22		22520/1-01		22520/1-02	-	3
			22520/2-01		22520/2-02		6
			22520/7-01		22520/7-02		5
	20		22520/1-01		22520/1-02	-	4
			22520/2-01		22520/2-02		7
			22520/7-01		22520/7-02		6
	18 *		22520/1-01		22520/1-02	-	5
			22520/2-01		22520/2-02		8
			22520/7-01		22520/7-02		7
			[illegible]		[illegible]	BLUE	[illegible]
SC1602	20		22520/2-01		[illegible]	[illegible]	[illegible]
			22520/7-01		22520/7-03	-	6
	18 *		22520/1-01		22520/2-02	BLUE	5
			22520/7-01		22520/7-03	-	7
PA1200 SA1200	16		22520/1-01		22520/2-02	YELLOW	6
	14						7
	12						8
SA1202	24		22520/1-01		22520/2-02	YELLOW	2
	22						3
	20						4
	18						5

* ONLY FOR CONTACTS NSA935151PAXXXX OR NSA938152SAXXXX

Normal Contact - Crimping Tools
For NSA9358151 And NSA938152

20 · 48 · 21

For contact P/N NSA938152SA2000 with cable gauge 24, the crimping tool is:
M22520/2-01 with turret M22520/1-02 selector position 2.
Or M22520/2-01 with turret M22520/2-02 selector position 5.
Or M22520/7-01 with turret M22520/7-02 selector position 4.

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ELECTRICAL STANDARD PRACTICES MANUAL

	MISCELLANEOUS	MANUFACTURER	TOPIC NUMBER
	2LA004891		20-45-17
	2LA004892		20-45-17
	2LA005075		20-45-17
	359-0697-020	COLLINS	20-25-41
	359-0697-050	COLLINS	20-25-41
	370-8040-030	COLLINS	20-25-41
	409775-1	AMP	20-25-22
	45-1773	STRIPMASTER	20-25-11
	45-1774	STRIPMASTER	20-25-11
	45-1939	STRIPMASTER	20-25-11
	45-2020	STRIPMASTER	20-25-11
	46121	AMP	20-25-22
	46447	AMP	20-25-22
	46467	AMP	20-25-22
	46468	AMP	20-25-22
	46469	AMP	20-25-22
	46470	AMP	20-25-22
	47386	AMP	20-25-22
	47387	AMP	20-25-22
	476408	AMP	20-25-22
	48518	AMP	20-25-22
	484364-1	AMP	20-25-22
	49935	AMP	20-25-22
	49965	AMP	20-25-22
	500A	RAYCHEM	20-25-31
	502	RAYCHEM	20-25-31
R	529	UTICA	20-33-45
	576778	AMP	20-25-22
	576779	AMP	20-25-22
	576780	AMP	20-25-22
	576781	AMP	20-25-22
	576782	AMP	20-25-22
	576783	AMP	20-25-22
	576784	AMP	20-25-22
	579316	JAEGER	20-25-22
	58T-101	EATON	20-25-53
	58T-106	EATON	20-25-53
	58T-107	EATON	20-25-53
	58T-108	EATON	20-25-53
R	580030	SOURIAU	20-33-45
	58095-1	AMP	20-25-41

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Introduction	

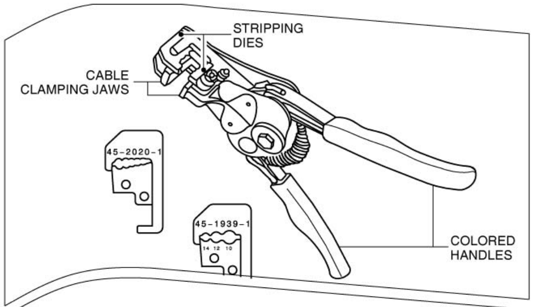
(3) How to replace a contact on a connector (cont'd)

Step 9:

Where to find information about these tools?

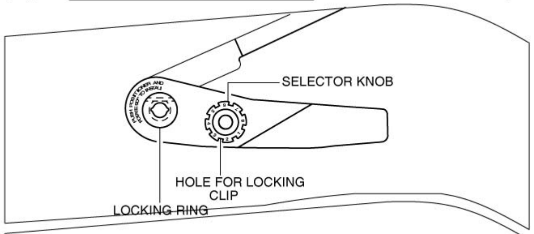
Consult the cross reference table (Tool Reference index).

- Stripmaster stripping tool **45-2020-1** is described in WDM chapter 20-25-11



STRIPPING TOOLS - STRIPMASTER
45-2020, 45-1939, 45-1773 AND 45-1774
20 · 25 · 11

- Mil crimping tools **M22520/2-01 OR M22520/7-01** are described in the WDM Chapter 20-



HAND CRIMPING TOOL - DANIELS
M22520/2-01
20 · 25 · 22

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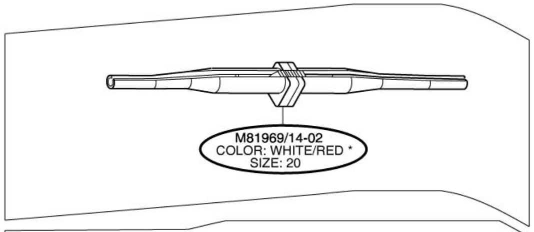
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Introduction	

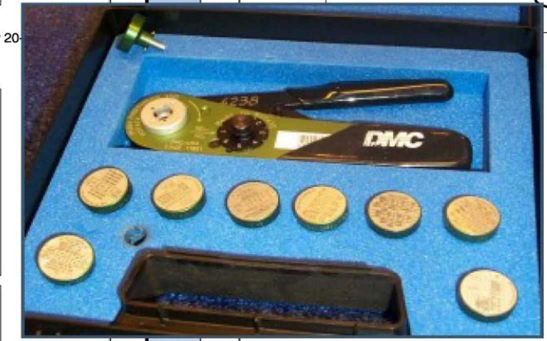
(3) How to replace a contact on a connector (cont'd)

9 (cont'd)

rtion/extraction tool **MIL81969/14-02** is described in ESPM Chapter 20-25-41



INSERTION/EXTRACTION TOOLS - EXAMPLES OF TOOLS
M81969/14



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SIS 20 25 41 0 ALMO 02

EFF : ALL

Insertion/Extraction Tools - M81969/14 and ...

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AIRBUS ELECTRICAL STANDA...

PLASTIC TOOLS:

M81969/14-XX
M81969/39-01

TOOL MIL P/N	TYPE/COLOR		CONTACT SIZE	EQUIVALENCE					
	EXT	INS		CANNON	DEUTSCH	MS	MS	NAS	SOURIAU
M81969/14-01	WHITE	GREEN	22	CIET 22D-01	—	MS 27534-22D	—	—	8599-0022
M81969/14-02	WHITE	RED	20	—	M15570-20	MS 27534-20	MS 3447-20	—	8522-20
M81969/39-01	WHITE	GREEN	20	CIET 20HD	—	MS 18278-1	—	—	—
M81969/14-03	WHITE	BLUE	16	CIET 16-03	M15570-16	MS 27534-16 MS 83723.31.16	MS 3447-16	1664-16	8522-16 8522-62 +8522-2921
M81969/14-04	WHITE	YELLOW	12	CIET 12-04	M15570-12	MS 27534-12	MS 3447-12	1664-12	8522-12

NOTE : DIFFERENT GEOMETRY DEPENDING ON SUPPLIERS

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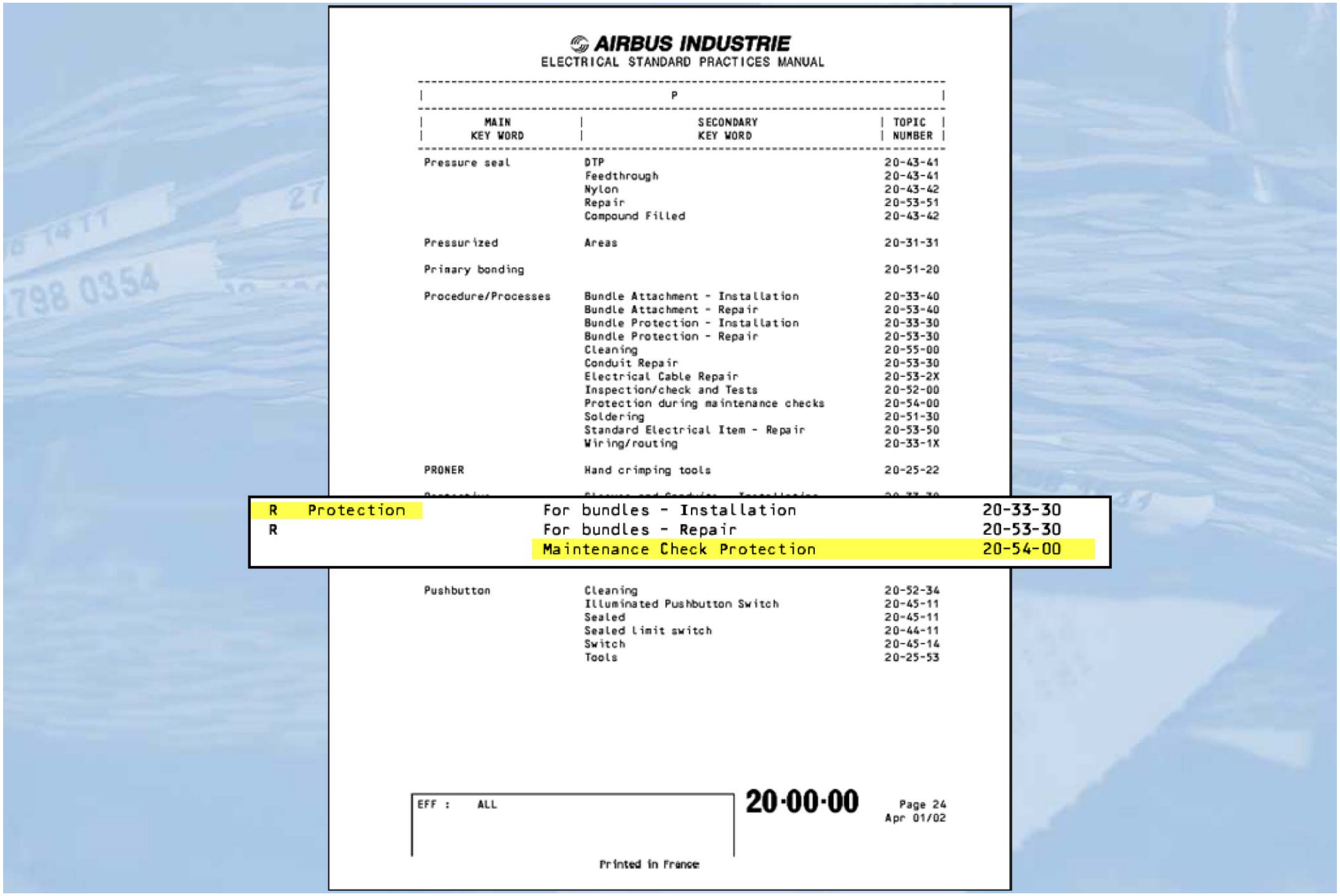

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ELECTRICAL STANDARD PRACTICES MANUAL

P

MAIN KEY WORD	SECONDARY KEY WORD	TOPIC NUMBER
Pressure seal	DTP	20-43-41
	Feedthrough	20-43-41
	Nylon	20-43-42
	Repair	20-53-51
	Compound Filled	20-43-42
Pressurized	Areas	20-31-31
Primary bonding		20-51-20
Procedure/Processes	Bundle Attachment - Installation	20-33-40
	Bundle Attachment - Repair	20-53-40
	Bundle Protection - Installation	20-33-30
	Bundle Protection - Repair	20-53-30
	Cleaning	20-55-00
	Conduit Repair	20-53-30
	Electrical Cable Repair	20-53-2X
	Inspection/check and Tests	20-52-00
	Protection during maintenance checks	20-54-00
	Soldering	20-51-30
	Standard Electrical Item - Repair	20-53-50
	Wiring/routing	20-33-1X
PRONER	Hand crimping tools	20-25-22
R Protection	For bundles - Installation	20-33-30
R	For bundles - Repair	20-53-30
	Maintenance Check Protection	20-54-00
Pushbutton	Cleaning	20-52-34
	Illuminated Pushbutton Switch	20-45-11
	Sealed	20-45-11
	Sealed limit switch	20-44-11
	Switch	20-45-14
	Tools	20-25-53

EFF : ALL

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CHAPTER CROSS-REFERENCE INDEX

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ELECTRICAL STANDARD PRACTICES MANUAL
PROTECTION BY CAPS - DESCRIPTION AND OPERATION

1. General
This chapter gives the different protections that must be installed on connectors (plug and receptacle) during maintenance checks, and in case of equipment disconnection.

2. Protective Caps
Protective caps are used to prevent contamination or damage to the contacts.

A. Caps for NAS 1599 type connectors.
(Ref. Fig. 001)

B. Caps for ARINC type connectors.
(Ref. Fig. 002)

C. Caps for rectangular type connectors.
(Ref. Fig. 003)

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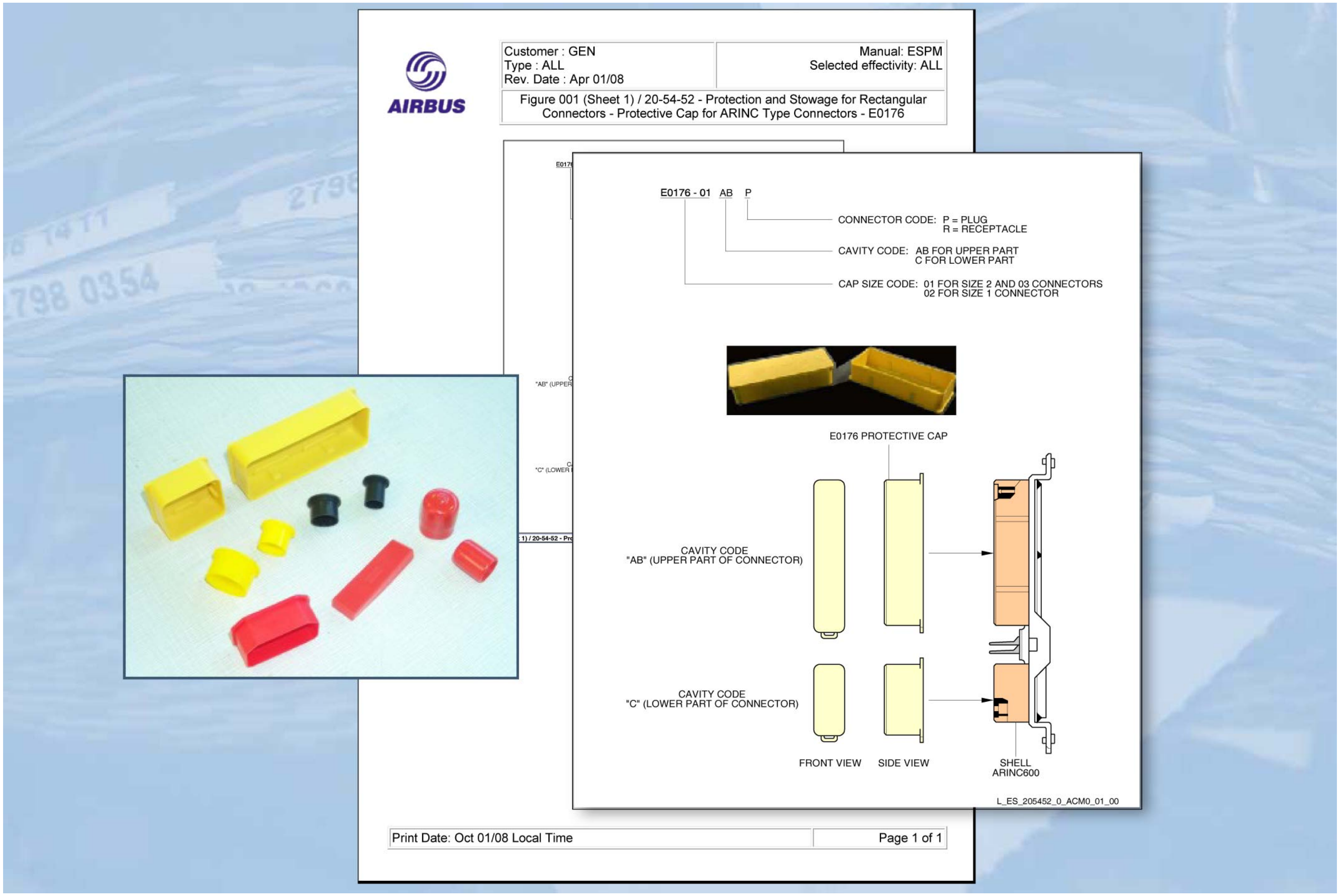
CHAPTER CROSS-REFERENCE INDEX



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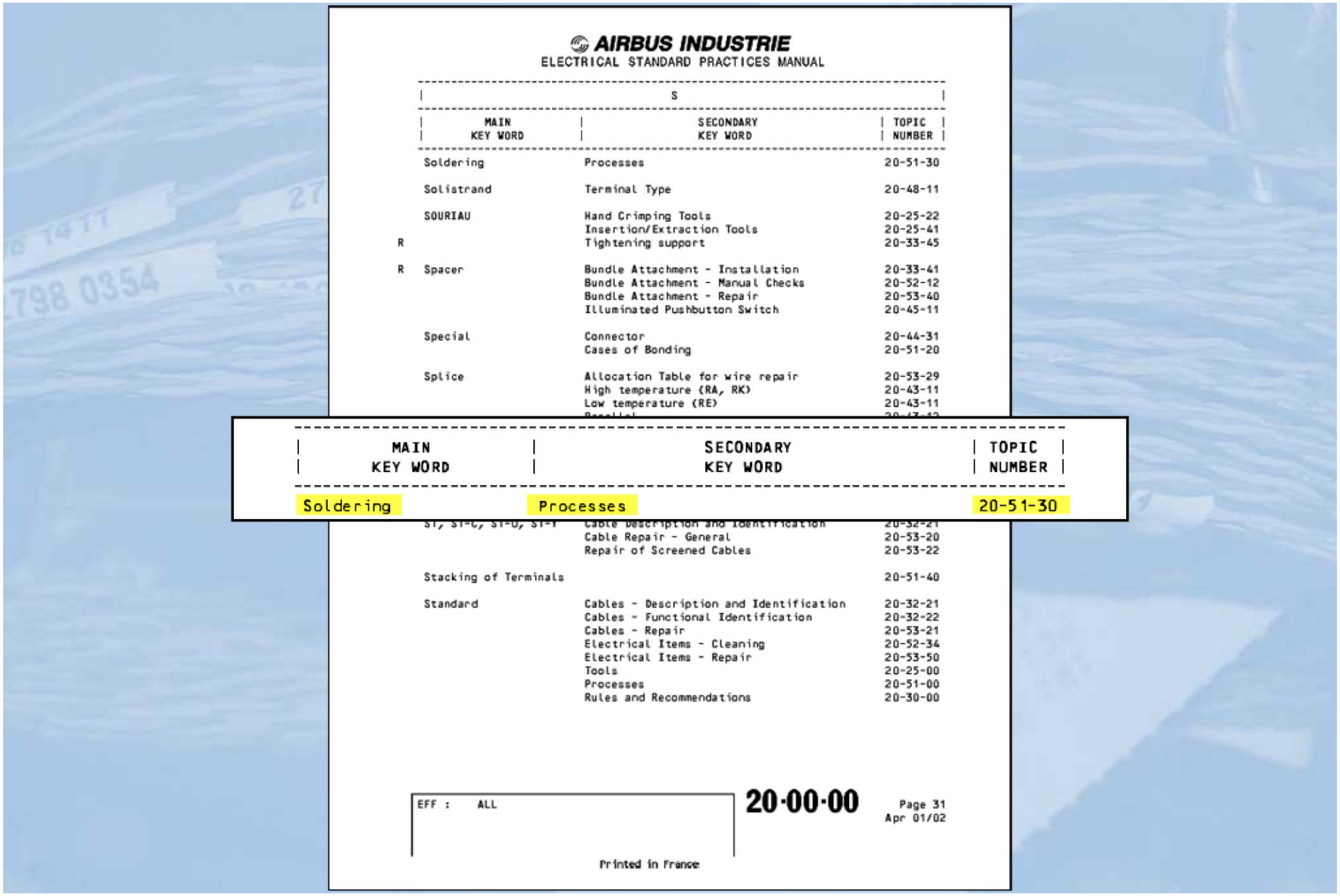

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S

	MAIN KEY WORD	SECONDARY KEY WORD	TOPIC NUMBER
	Soldering	Processes	20-51-30
	Solistrand	Terminal Type	20-48-11
	SOURIAU	Hand Crimping Tools	20-25-22
		Insertion/Extraction Tools	20-25-41
R		Tightening support	20-33-45
R	Spacer	Bundle Attachment - Installation	20-33-41
		Bundle Attachment - Manual Checks	20-52-12
		Bundle Attachment - Repair	20-53-40
		Illuminated Pushbutton Switch	20-45-11
	Special	Connector	20-44-31
		Cases of Bonding	20-51-20
	Splice	Allocation Table for wire repair	20-53-29
		High temperature (RA, RK)	20-43-11
		Low temperature (RE)	20-43-11
	ST, ST-C, ST-D, ST-T	Cable Description and Identification	20-32-21
		Cable Repair - General	20-53-20
		Repair of Screened Cables	20-53-22
	Stacking of Terminals		20-51-40
	Standard	Cables - Description and Identification	20-32-21
		Cables - Functional Identification	20-32-22
		Cables - Repair	20-53-21
		Electrical Items - Cleaning	20-52-34
		Electrical Items - Repair	20-53-50
		Tools	20-25-00
		Processes	20-51-00
		Rules and Recommendations	20-30-00

MAIN KEY WORD	SECONDARY KEY WORD	TOPIC NUMBER
Soldering	Processes	20-51-30

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ELECTRICAL STANDARD PRACTICES MANUAL

SOLDERING PROCESSES - DESCRIPTION AND OPERATION

1. General
   This chapter gives the general processes for the repair or replacement of soldered connections/items on the aircraft.

WARNING: BEFORE YOU DO WORK ON ELECTRICAL CABLES, MAKE SURE THAT THEY ARE NOT CONNECTED TO AN ELECTRICAL POWER SOURCE. THERE IS A RISK OF ELECTROCUTION IF AC OR DC POWER STAYS CONNECTED.

WARNING: BE CARREFUL WHEN YOU USE ELECTRIC HAND TOOLS ON THE AIRCRAFT. IF THERE ARE LOCAL REGULATIONS RELATED TO ELECTRIC HAND TOOLS, MAKE SURE THAT YOU OBEY THEM.

WARNING: BEFORE YOU DO WORK ON ELECTRICAL CABLES, MAKE SURE THAT THEY ARE NOT CONNECTED TO AN ELECTRICAL POWER SOURCE. THERE IS A RISK OF ELECTROCUTION IF AC OR DC POWER STAYS CONNECTED.

WARNING: BE CARREFUL WHEN YOU USE ELECTRIC HAND TOOLS ON THE AIRCRAFT. IF THERE ARE LOCAL REGULATIONS RELATED TO ELECTRIC HAND TOOLS, MAKE SURE THAT YOU OBEY THEM.

CAUTION: DO NOT REPLACE A CRIMP CONTACT BY A SOLDER CONTACT. IF YOU USE A SOLDER CONTACT TO REPAIR A CRIMP CONTACT, YOU CAN CAUSE INCORRECT OPERATION OF THE RELATED FUNCTION(S).

CAUTION: BEFORE YOU DO SOLDERING, PUT PROTECTION IN THE WORK AREA TO COLLECT SOLDER THAT CAN FALL WHEN IT IS HOT. UNWANTED SOLDER CAN CAUSE DAMAGE AND/OR SHORT CIRCUITS.

CAUTION: DO NOT LET THE SOLDERING IRON OR THE HOT SOLDER TOUCH THE INSULATION. DO NOT APPLY HEAT WITH THE SOLDERING IRON FOR LONGER THAN IS NECESSARY.

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3. Desoldering of a wire
(Ref. Fig. 001)

A. Desoldering with a solder wick

(1) Make the soldering iron hot.

(2) Touch the solder it is necessary to remove with the en[...]
wick.

NOTE : To remove large quantities of solder, use two t[...]
solder wick.

(3) Touch the solder wick with the hot tip of the solderin[...]

(4) When all the hot solder is absorbed by the solder wick,[...]
solder wick.

NOTE : Cut the solder wick each time it absorbs solder.

B. Desoldering with a solder pump

(1) Make the soldering iron hot.

(2) Arm the solder pump.

(3) Touch the solder it is necessary to remove with the hot tip of the soldering iron.

(4) Touch the melted solder with the tip of the solder pump and press the button on the solder pump to remove the solder.

4. Soldering of a wire

A. Preparation of the Soldering Iron

(1) Make the soldering iron hot.

(2) If necessary, remove oxidation from the tip of the soldering iron with a moist sponge.

(3) Apply a thin layer of solder on the tip of the soldering iron.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 008 (Sheet 1) / 20-51-30 - Soldering Processes - Disconnection Principle with a Solder Pump	

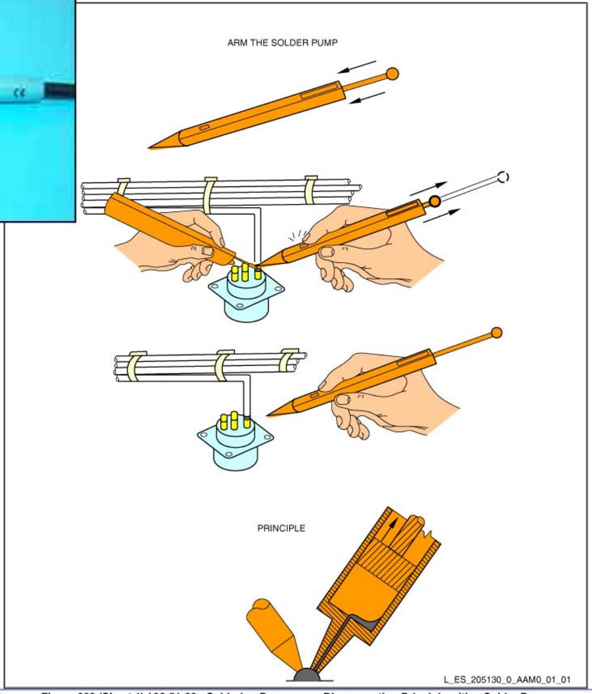

Figure 008 (Sheet 1) / 20-51-30 - Soldering Processes - Disconnection Principle with a Solder Pump

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B. Preparation of the wire(s)
(Ref. Fig. 002)
For coaxial cables, refer to the 20-48-XX

(1) Strip the wire to a lenght of 10 mm (xxxx inch) with t
applicable for the wire (Ref 20-48-XX).

(2) Make sure that the core of the wire is dry.

(3) Tin the wire:
- Touch the core with the hot tip of the soldering iro
- Apply the solder on the core
- Let the solder flow between the strands of the core
- Remove the soldering iron and let the core become co

(4) Cut the tinned core to the required length for the typ
connection:
- For solder contacts, refer to the relevant stripping
in 20-48-XX.

C. Connection of the wire

(1) Contacts
(Ref. Fig. 003)

(a) Connect the wire to the contact:
- Touch the contact with the hot tip of the soldering iron
- Apply the solder in the contact
- Let the solder melt in the contact
- Fully engage the wire in the contact
- Remove the soldering iron and do not let the contact assembly
move until it is cool.

(b) Examine the solder connection
(Ref. Fig. 004)

(2) Coaxial Contacts
(Ref. Fig. 005)

(a) Connect the wire to the contact:
- Engage the contact on the tinned wire
- Touch the contact with the hot tip of the soldering iron
- Apply the solder on the contact
- Let the solder melt
- Remove the soldering iron and do not let the contact assembly
move until it is cool.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-51-30 - Soldering Processes - Wire Preparation	

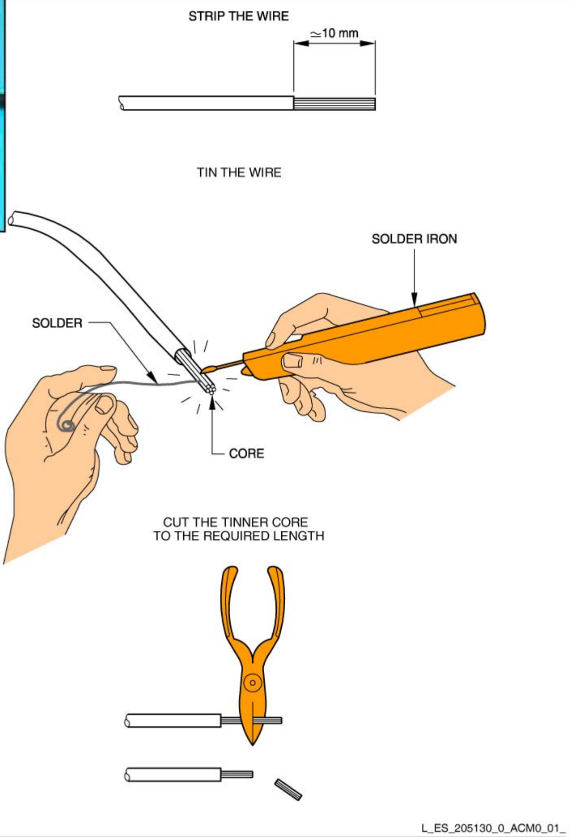

Figure 001 (Sheet 1) / 20-51-30 - Soldering Processes - Wire Preparation

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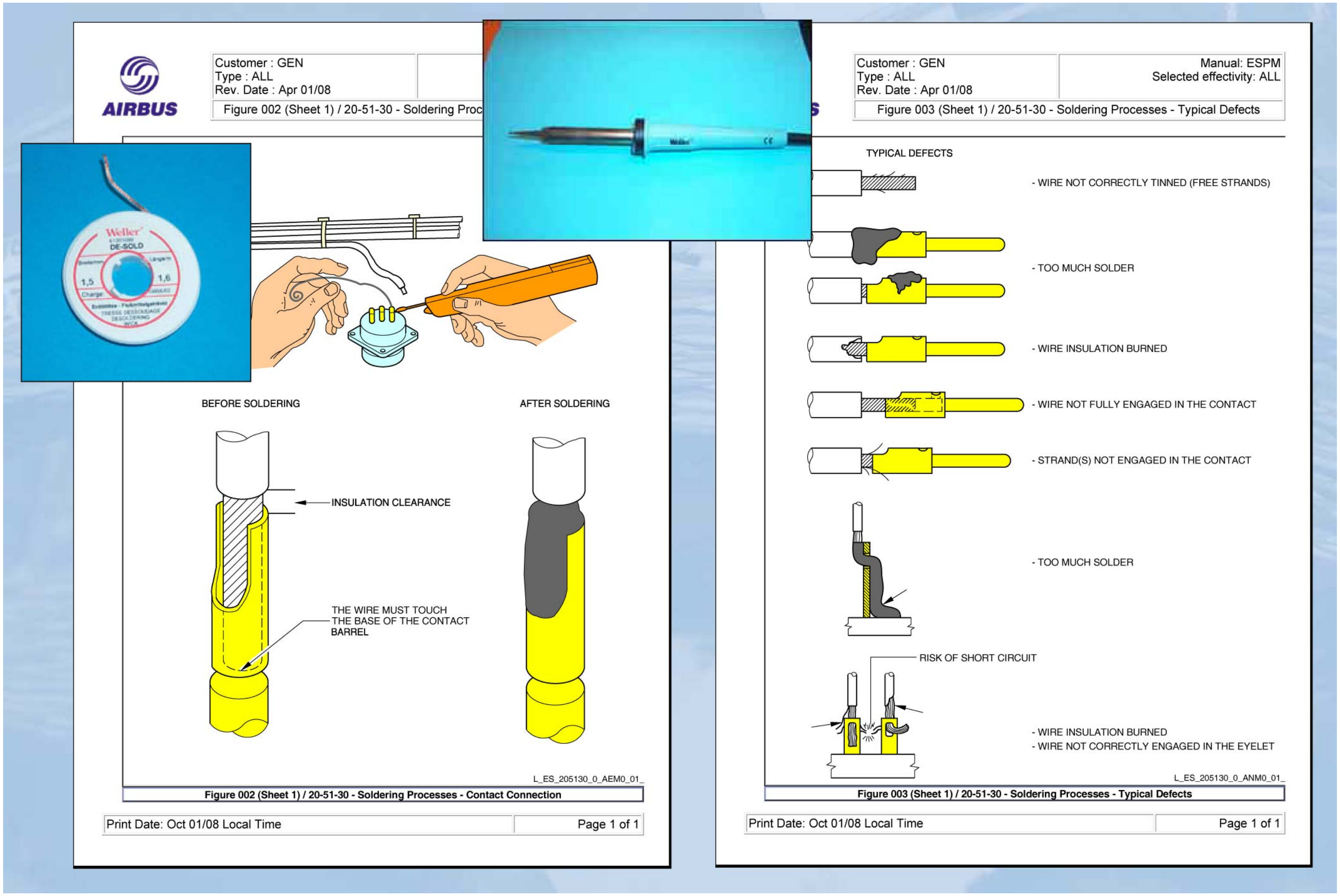

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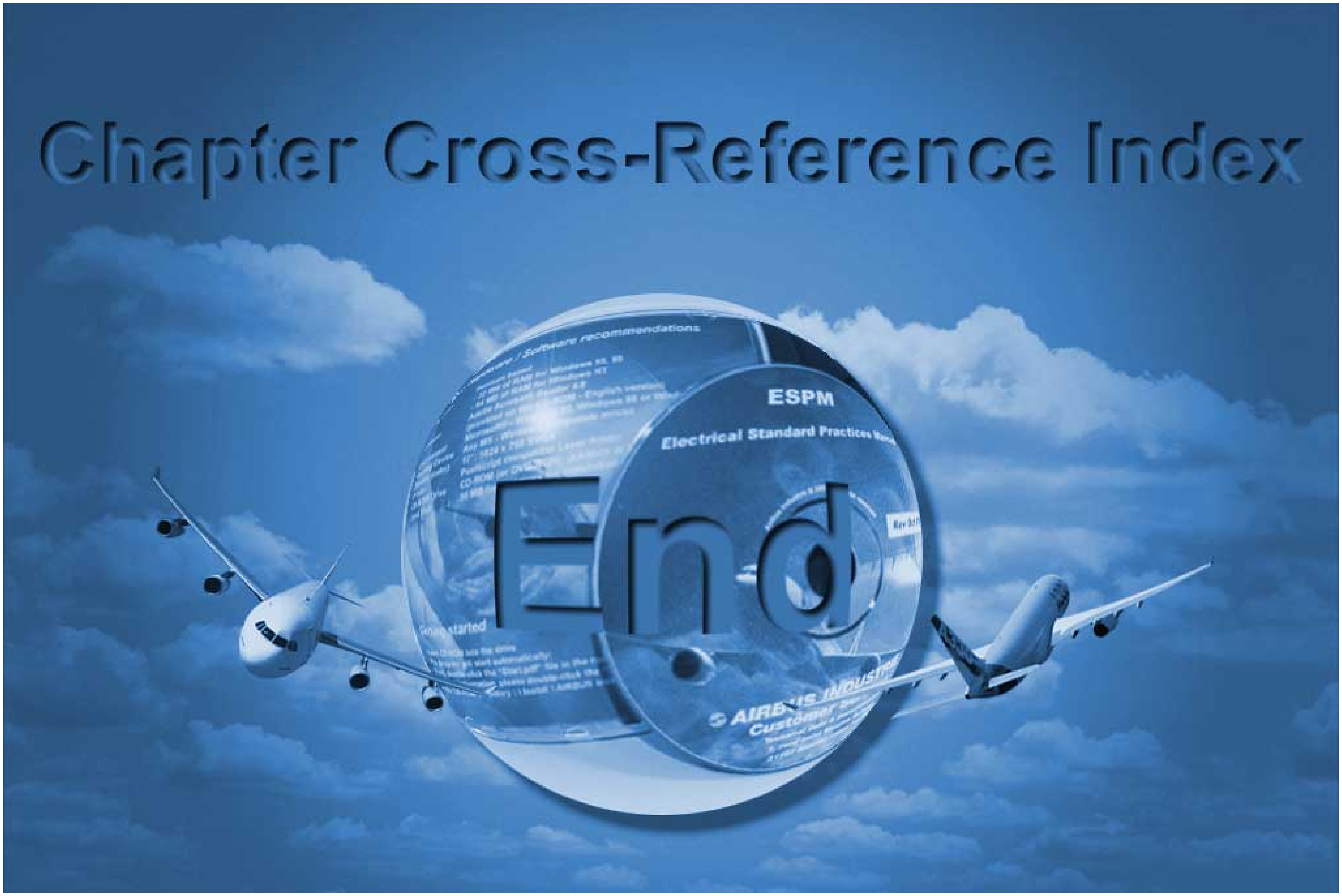

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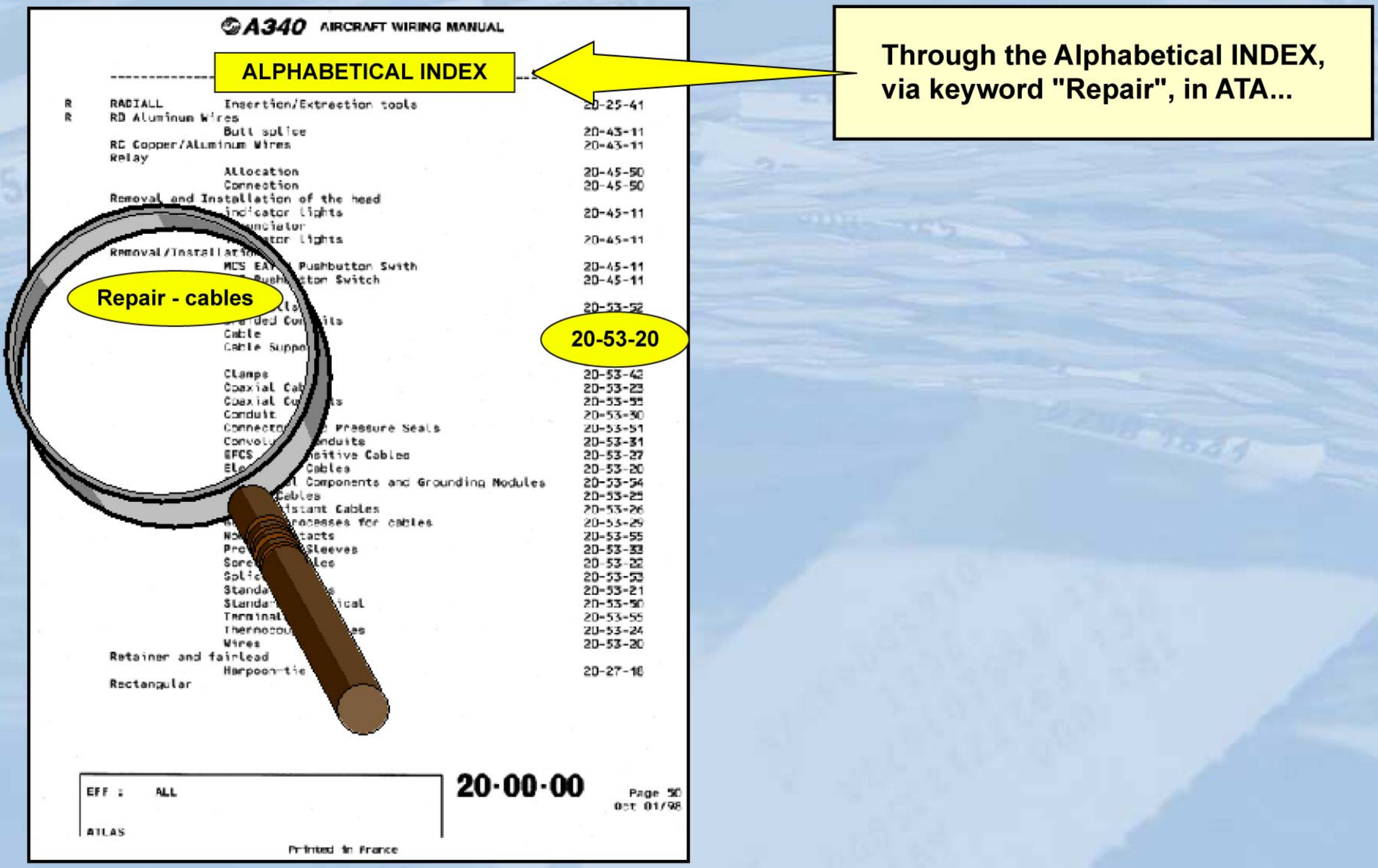
IMPORTANT DATA TABLE

WHERE TO FIND THE METHODS OF REPAIRS?

In this module, we will explain to you how to find the data concerning wire.
Firstly let's suppose you have to repair a wire.
The question is where to find the data?
With the key word "repair"; you have to look into the alphabetical index.
As soon as you find it, you retrieve "repair cables" and theirs location in the ESPM.
The guideline when you are in this situation is to keep in mind this process.
Further to an inspection, the cable 3231-0014 is found damaged (screening and sheath).
The cable is a multi-core screened one. (Constituted of 2 wires red and blue Gauge 20).
This is a vendor cable. The area is not specific.
With the Master Wire List, you can identify the damaged wire, type and gauge.
Now, with this information, you have to assess the wire damage.
Select in the index "repair screened cables".
The index shows that you have to go in 20-53-22 chapter.
In this chapter, you must correlate the damage wire you found on the a/c and AWM damage assessment.
Within this example, we choose the last one at the bottom of the table: broken strands.
Now you have to define the repair grade and the repair method.
In this case, there are two possibilities of repair. The selection of the repair depends on the spare and a/c availability.
In this case we select temporary, grade 3, and repair method 2-F.
To do the repair in the best conditions, you have to look at the general repair layout first.
Select the repair method 2-F.
As you can see, you have to splice the broken wires and to install sleeves.
The sleeves must be installed first.
To select the sleeve part number, you have to take into account the gauge and the type of the wire.
To install the splices, use the same principle, in the repair splices allocation table.
Now, you can do the repair. Never forget that, if it is important to do a good repair, it is also mandatory to understand the cause of the damage, in order to prevent a new damage.

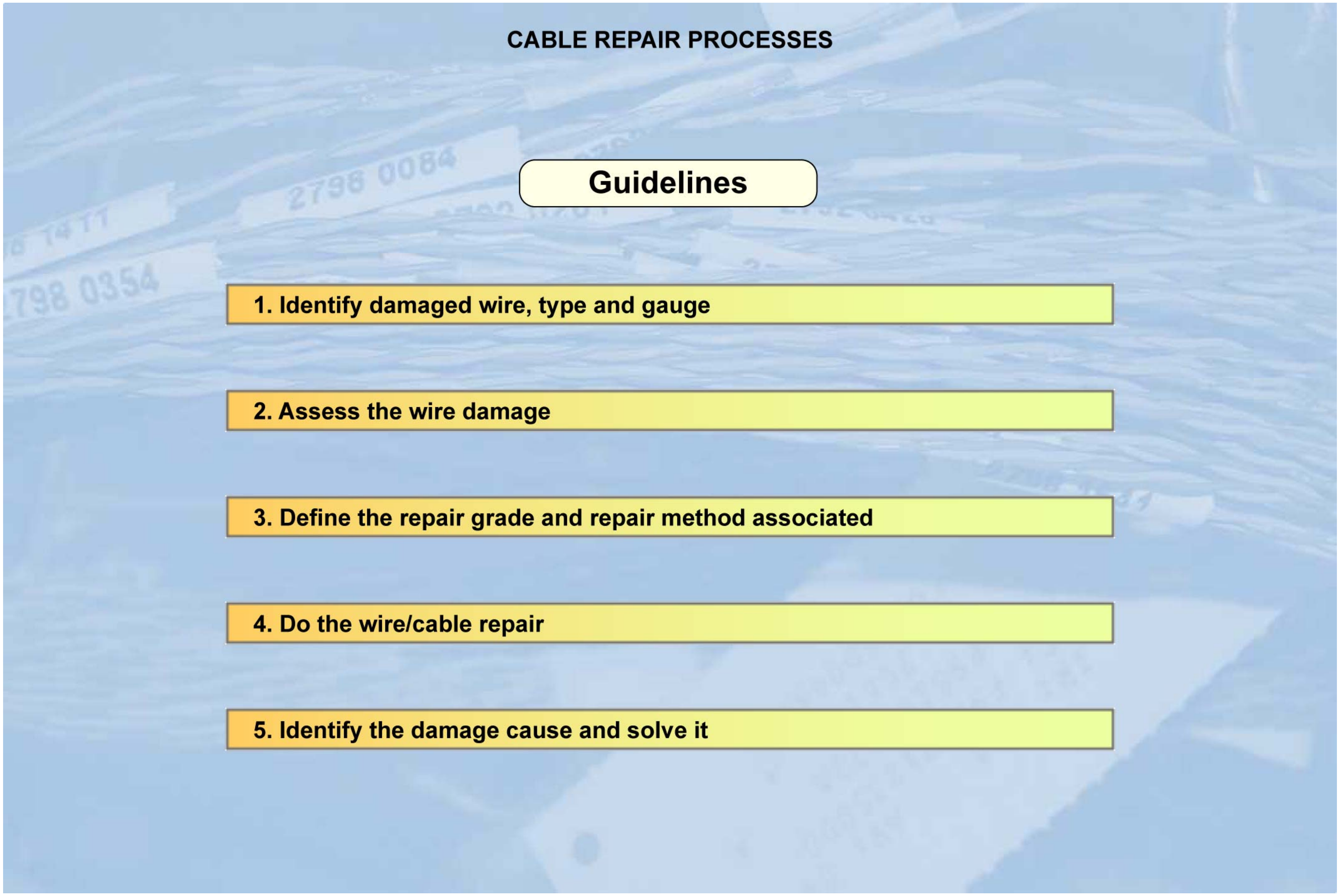
WHERE TO FIND THE METHODS OF REPAIRS?

CABLE REPAIR PROCESSES



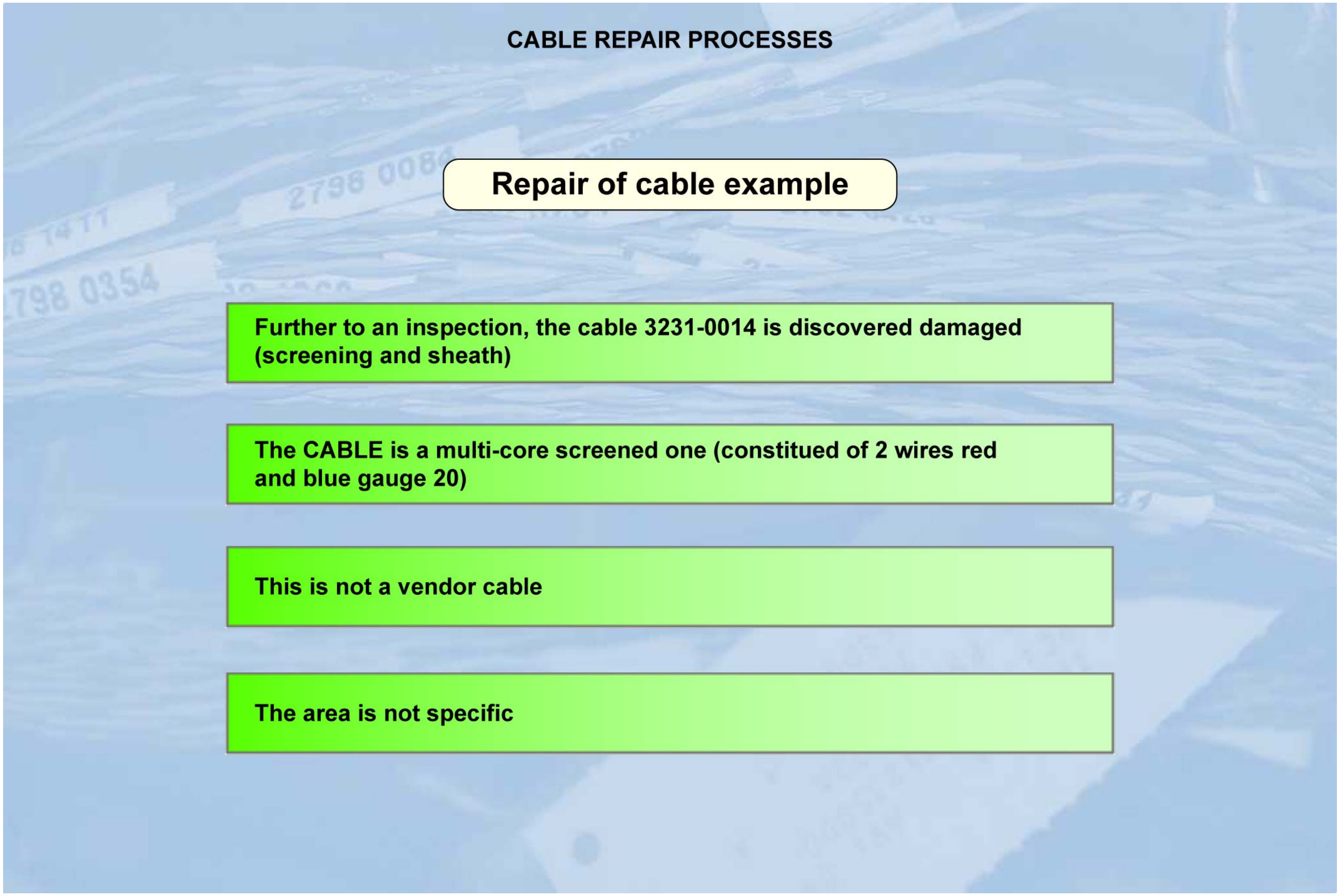
WHERE TO FIND THE METHODS OF REPAIRS?

X8U08481 - X0332T0 - XM2010000000001

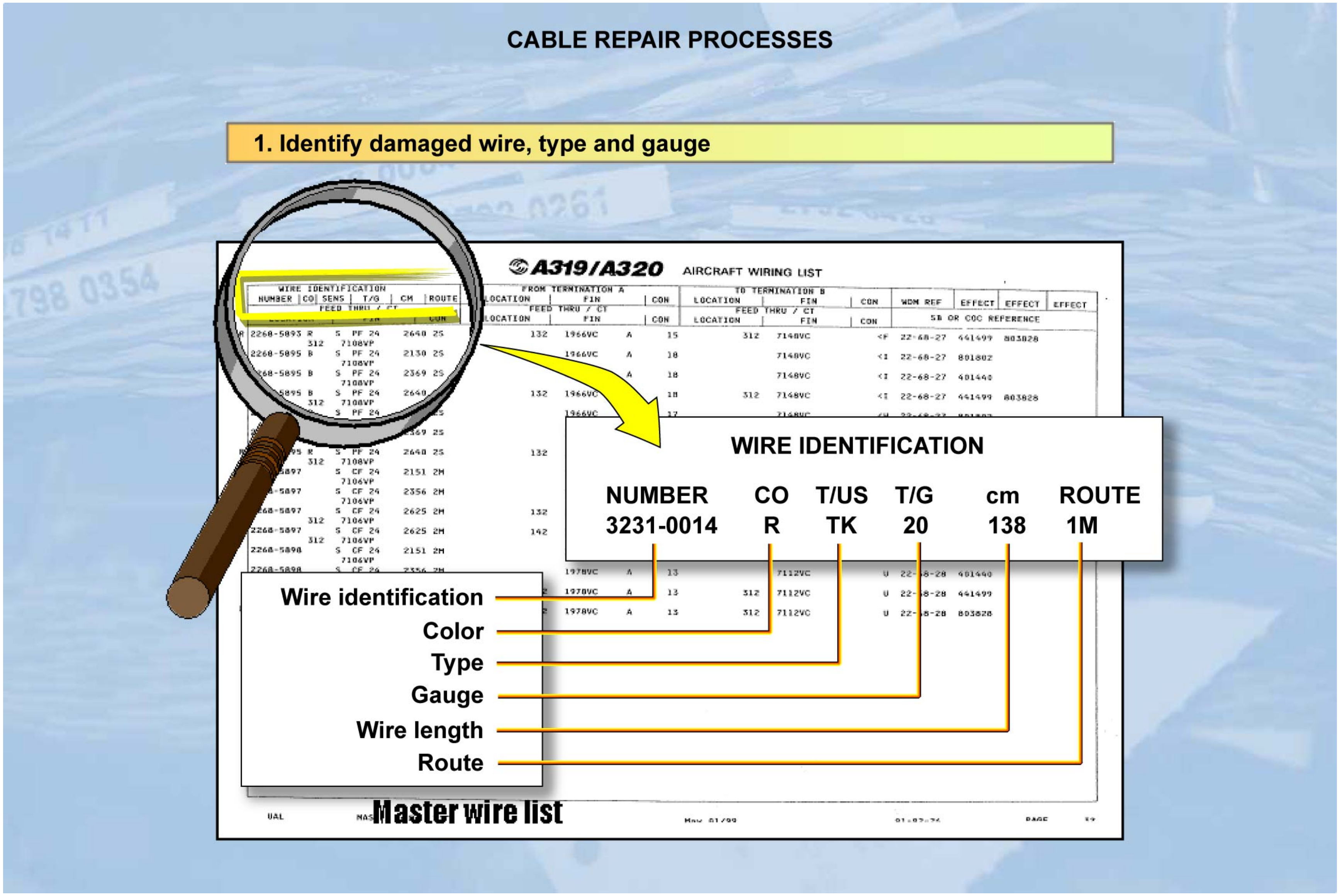


WHERE TO FIND THE METHODS OF REPAIRS?

X8U08481 - X0332T0 - XM201000000001

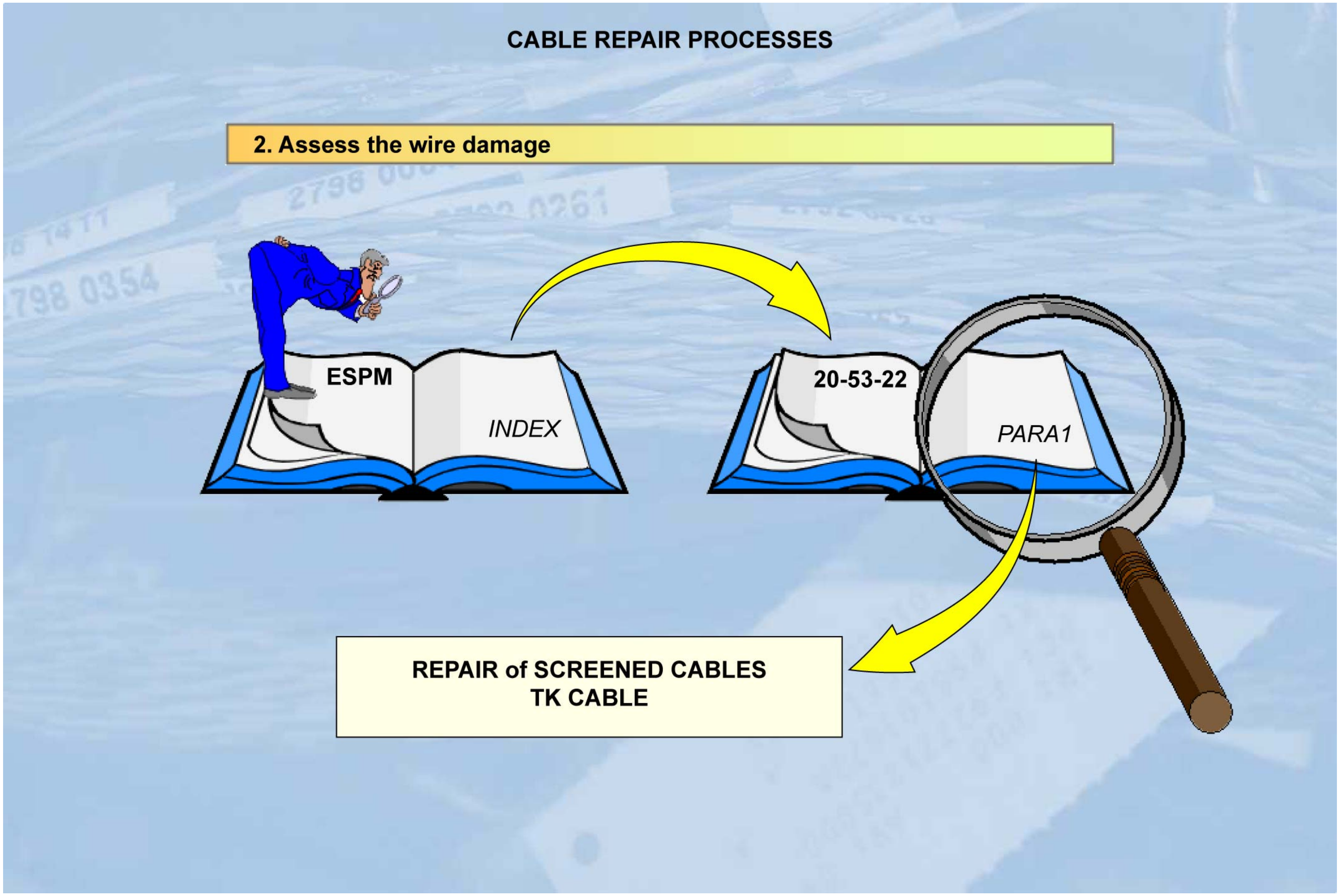


WHERE TO FIND THE METHODS OF REPAIRS?

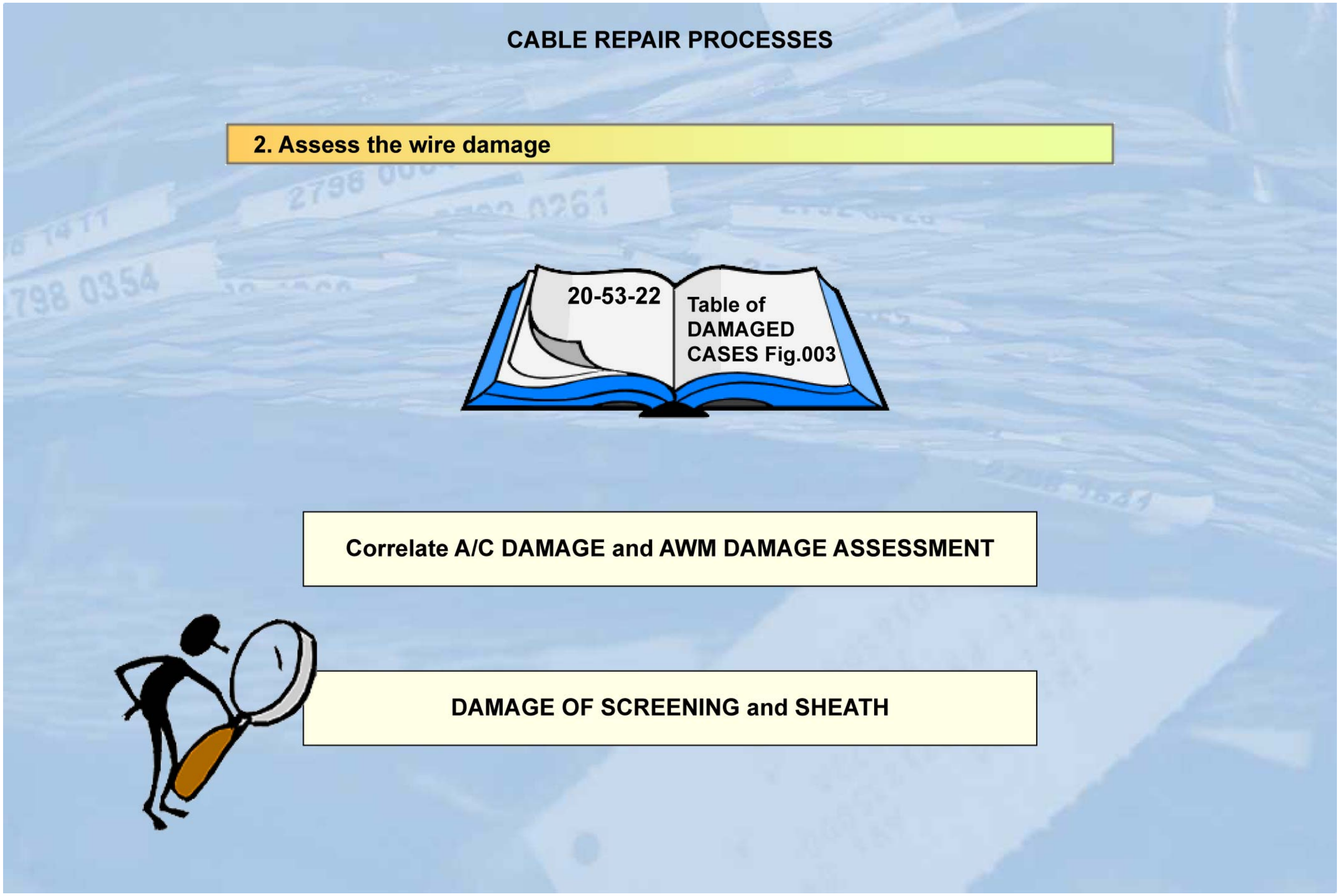


WHERE TO FIND THE METHODS OF REPAIRS?

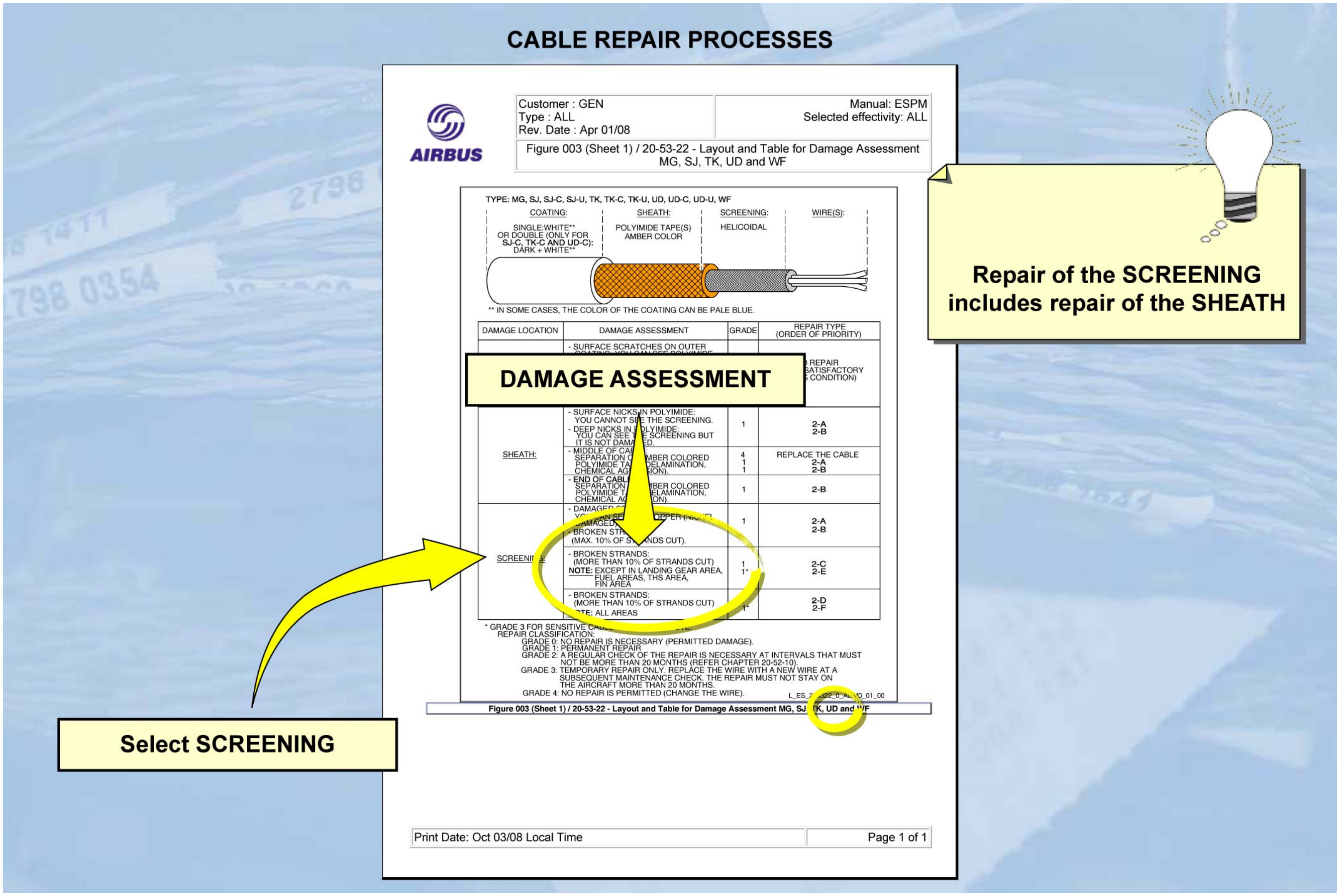
X8U08481 - X0332T0 - XM2010000000001



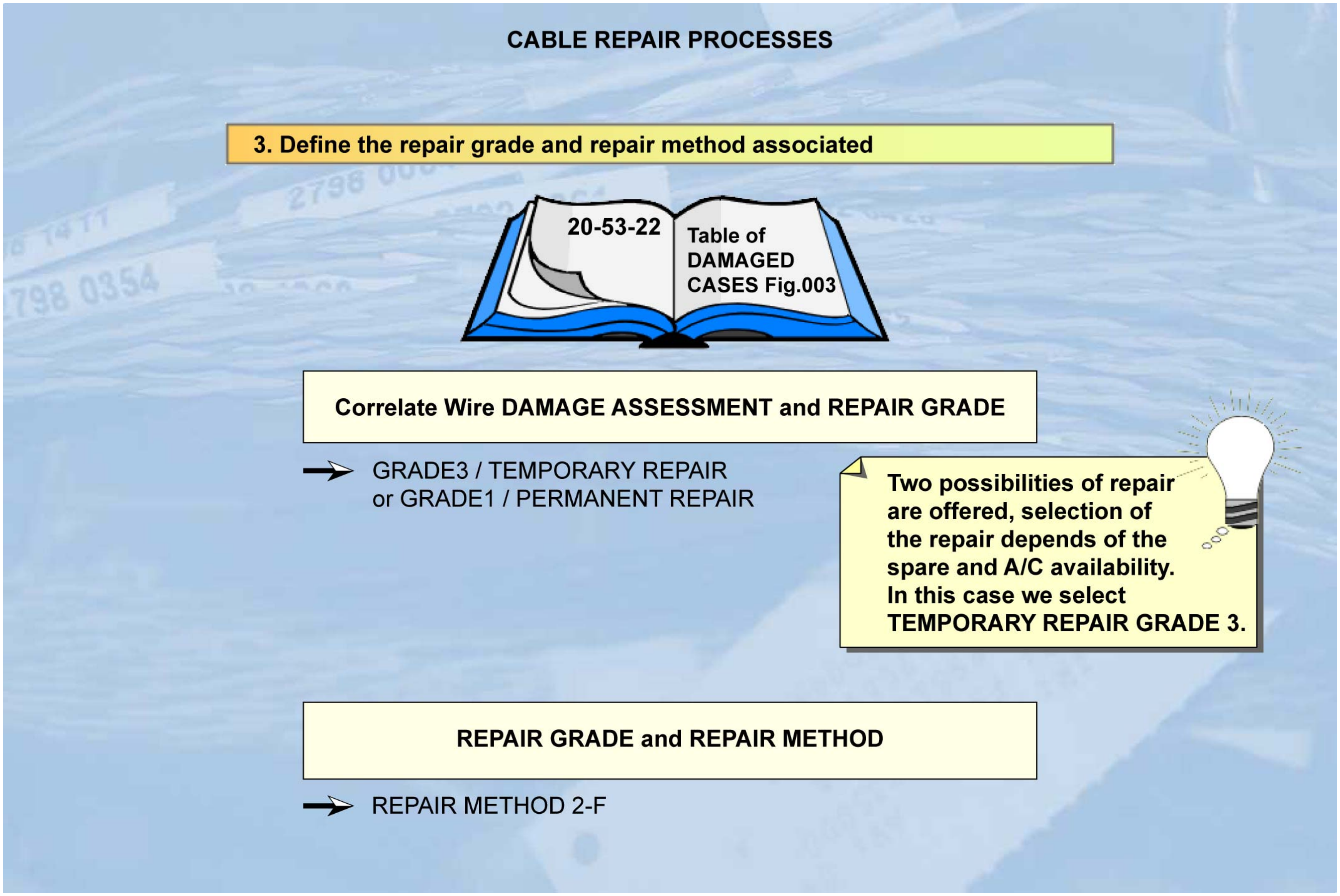
WHERE TO FIND THE METHODS OF REPAIRS?



WHERE TO FIND THE METHODS OF REPAIRS?

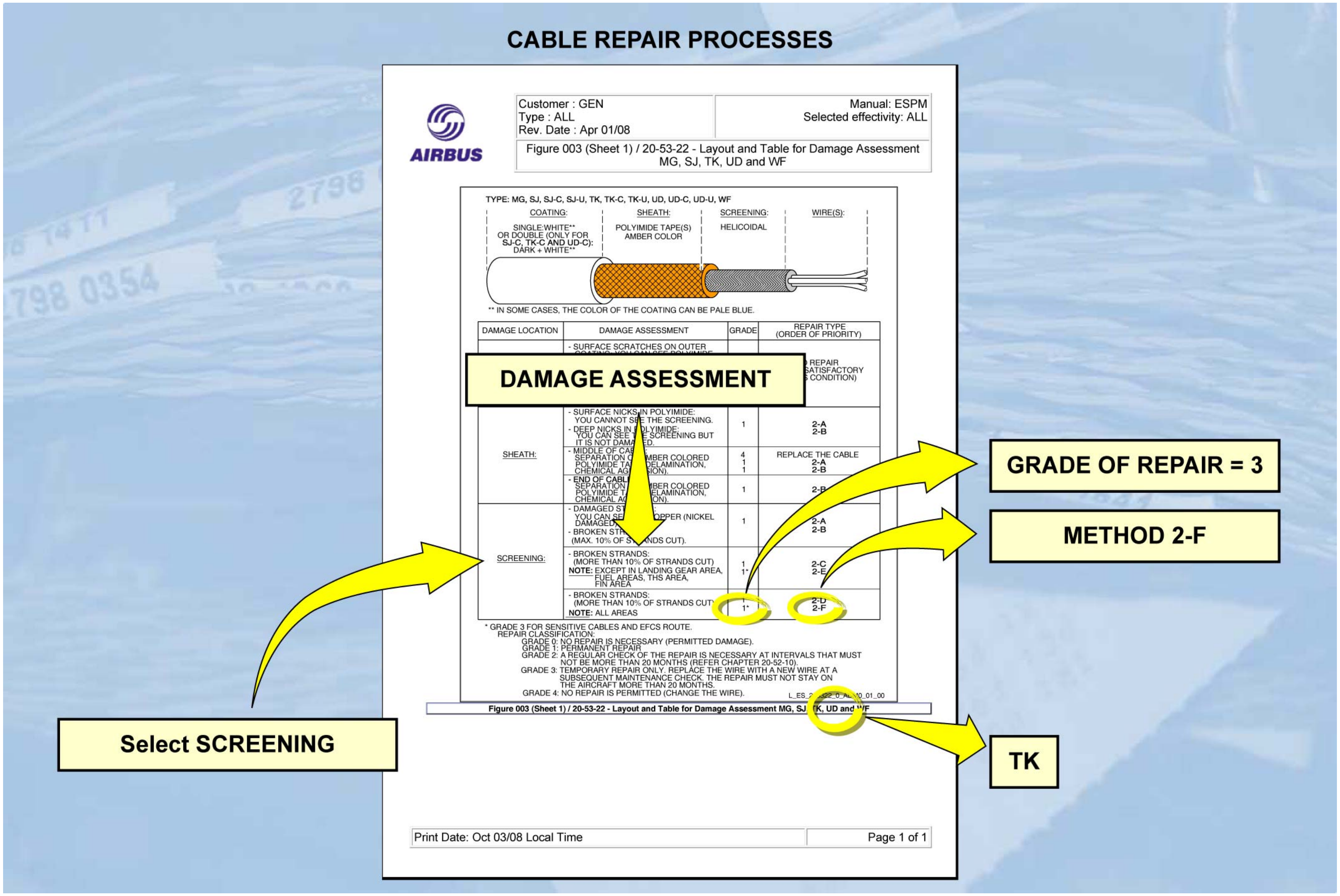


WHERE TO FIND THE METHODS OF REPAIRS?



WHERE TO FIND THE METHODS OF REPAIRS?

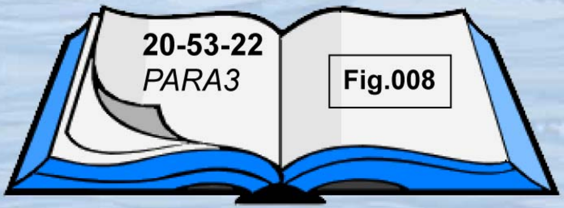
X8U08481 - X0332T0 - XM2010000000001



WHERE TO FIND THE METHODS OF REPAIRS?

CABLE REPAIR PROCESSES

4. Do the wire/cable repair



SELECT REPAIR METHOD 2-F

DO THE REPAIR PROCEDURE

- FIG-008 / GENERAL REPAIR LAYOUT
- FIG-014 / SLEEVE PN SELECTION
- FIG-009 / SLEEVE LAYOUT
- 20-53-29 FIG-003 SPLICE PN SELECTION

WHERE TO FIND THE METHODS OF REPAIRS?

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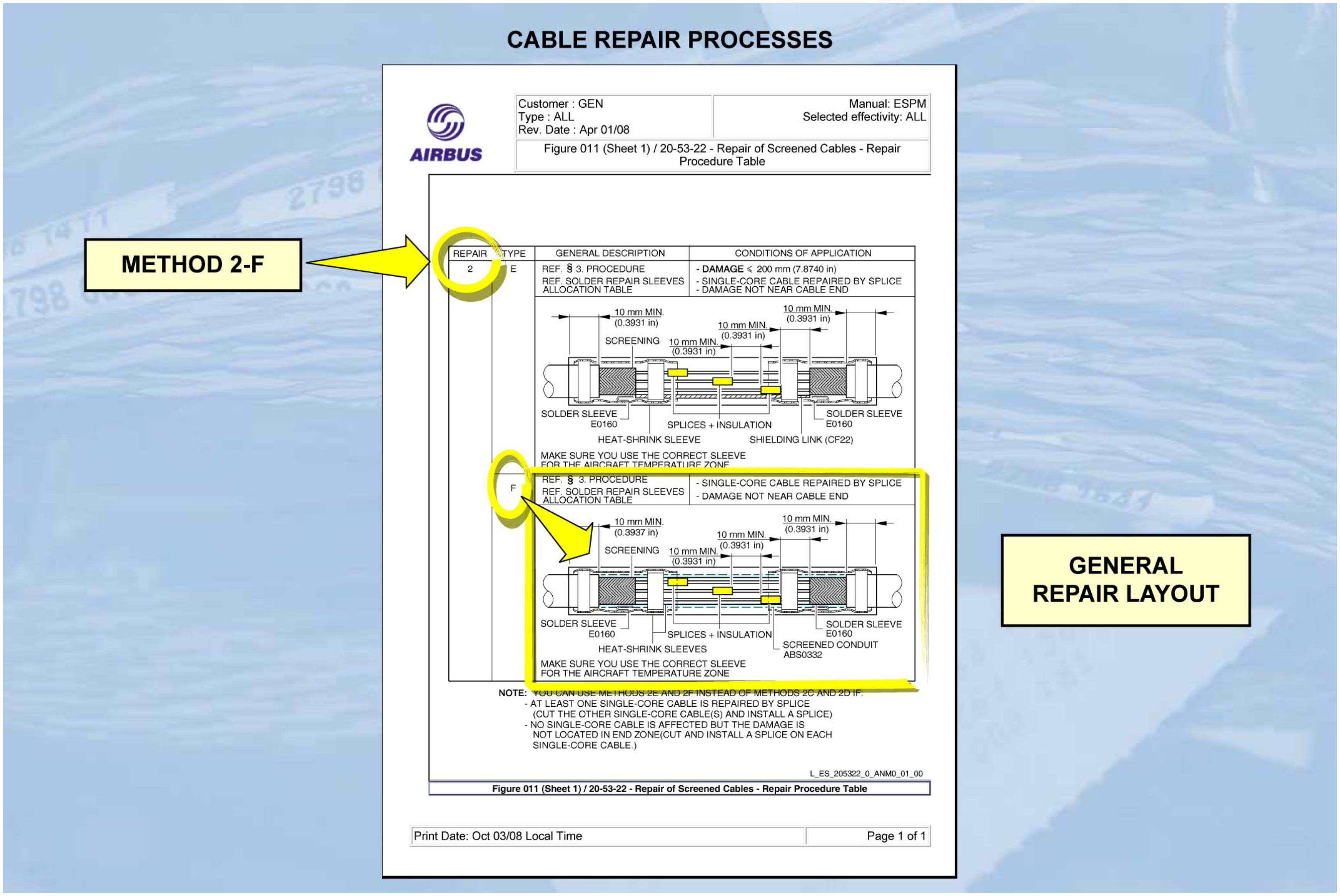
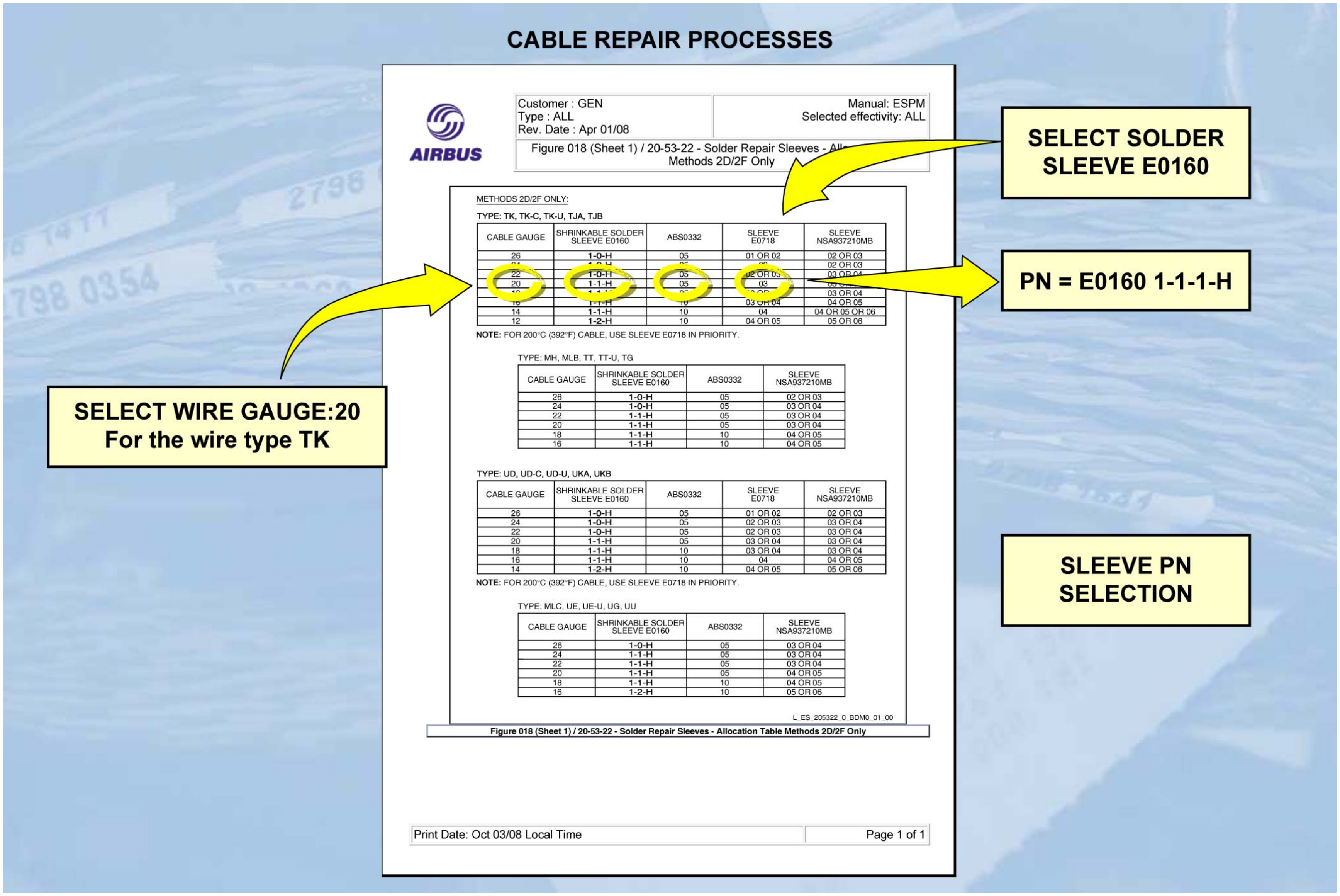


WHERE TO FIND THE METHODS OF REPAIRS?

CABLE REPAIR PROCESSES



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Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 018 (Sheet 1) / 20-53-22 - Solder Repair Sleeves - All[illegible]
Methods 2D/2F Only

METHODS 2D/2F ONLY:

TYPE: TK, TK-C, TK-U, TJA, TJB

CABLE GAUGE	SHRINKABLE SOLDER SLEEVE E0160	ABS0332	SLEEVE E0718	SLEEVE NSA937210MB
26	1-0-H	05	01 OR 02	02 OR 03
[illegible]	[illegible]	[illegible]	[illegible]	02 OR 03
22	1-0-H	05	[illegible]	03 OR 04
20	1-1-H	05	03	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	03 OR 04
16	1-1-H	10	03 OR 04	04 OR 05
14	1-1-H	10	04	04 OR 05 OR 06
12	1-2-H	10	04 OR 05	05 OR 06

NOTE: FOR 200°C (392°F) CABLE, USE SLEEVE E0718 IN PRIORITY.

TYPE: MH, MLB, TT, TT-U, TG

CABLE GAUGE	SHRINKABLE SOLDER SLEEVE E0160	ABS0332	SLEEVE NSA937210MB
26	1-0-H	05	02 OR 03
24	1-0-H	05	03 OR 04
22	1-1-H	05	03 OR 04
20	1-1-H	05	03 OR 04
18	1-1-H	10	04 OR 05
16	1-1-H	10	04 OR 05

TYPE: UD, UD-C, UD-U, UKA, UKB

CABLE GAUGE	SHRINKABLE SOLDER SLEEVE E0160	ABS0332	SLEEVE E0718	SLEEVE NSA937210MB
26	1-0-H	05	01 OR 02	02 OR 03
24	1-0-H	05	02 OR 03	03 OR 04
22	1-0-H	05	02 OR 03	03 OR 04
20	1-1-H	05	03 OR 04	03 OR 04
18	1-1-H	10	03 OR 04	03 OR 04
16	1-1-H	10	04	04 OR 05
14	1-2-H	10	04 OR 05	05 OR 06

NOTE: FOR 200°C (392°F) CABLE, USE SLEEVE E0718 IN PRIORITY.

TYPE: MLC, UE, UE-U, UG, UU

CABLE GAUGE	SHRINKABLE SOLDER SLEEVE E0160	ABS0332	SLEEVE NSA937210MB
26	1-0-H	05	03 OR 04
24	1-1-H	05	03 OR 04
22	1-1-H	05	03 OR 04
20	1-1-H	05	04 OR 05
18	1-1-H	10	04 OR 05
16	1-2-H	10	05 OR 06

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Figure 018 (Sheet 1) / 20-53-22 - Solder Repair Sleeves - Allocation Table Methods 2D/2F Only

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WHERE TO FIND THE METHODS OF REPAIRS?

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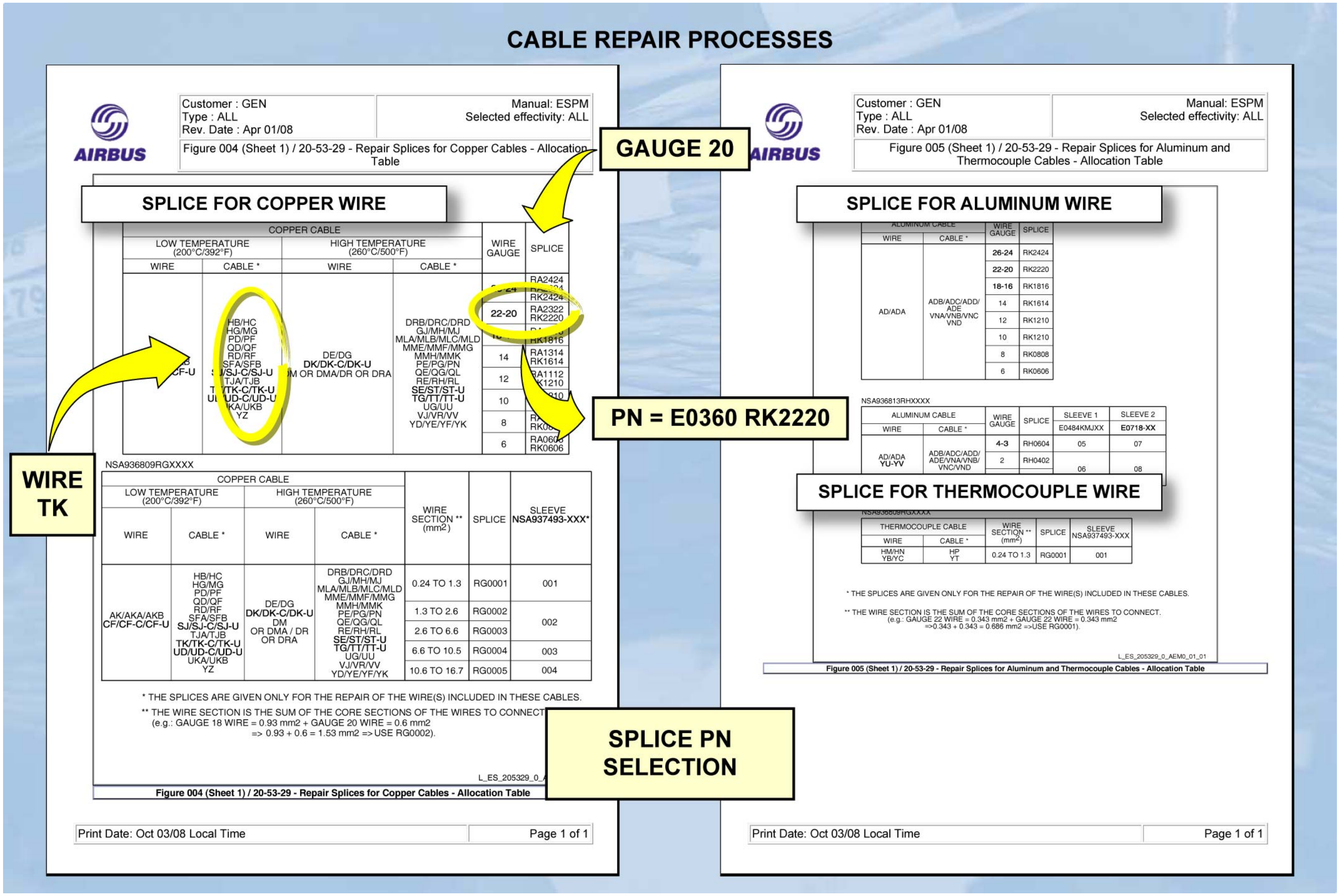
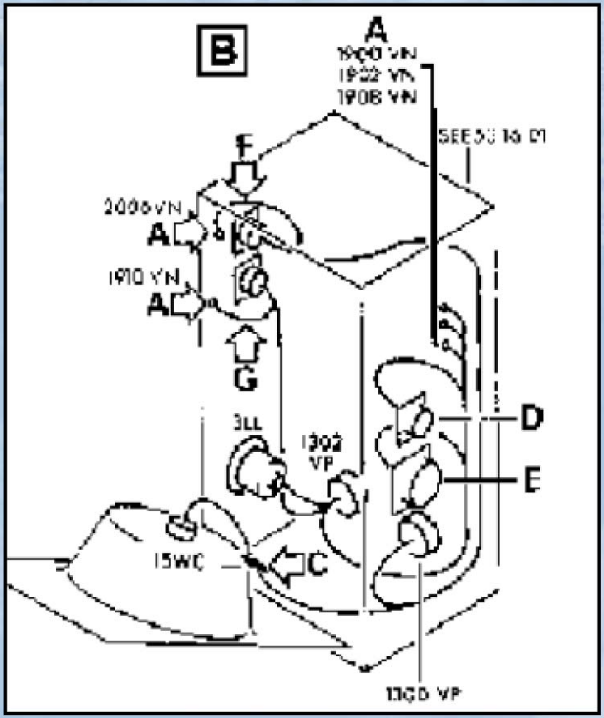


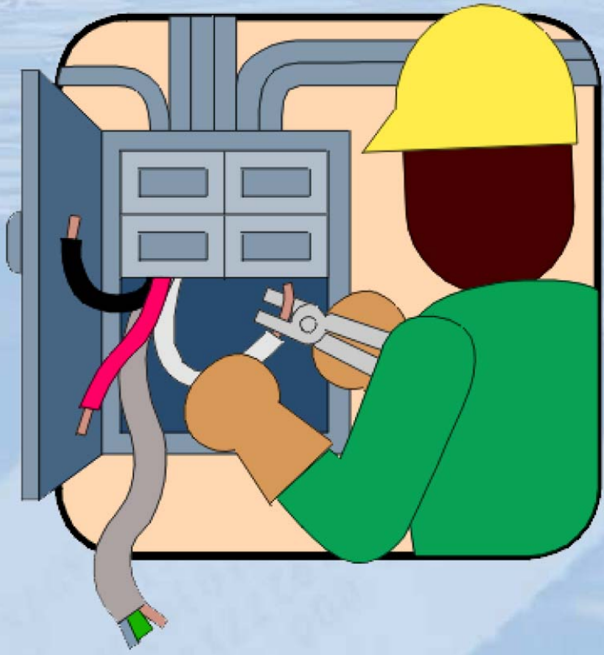
WHERE TO FIND THE METHODS OF REPAIRS?

X8U08481 - X0332T0 - XM201000000001

CABLE REPAIR PROCESSES

5. Identify the damage cause and solve it





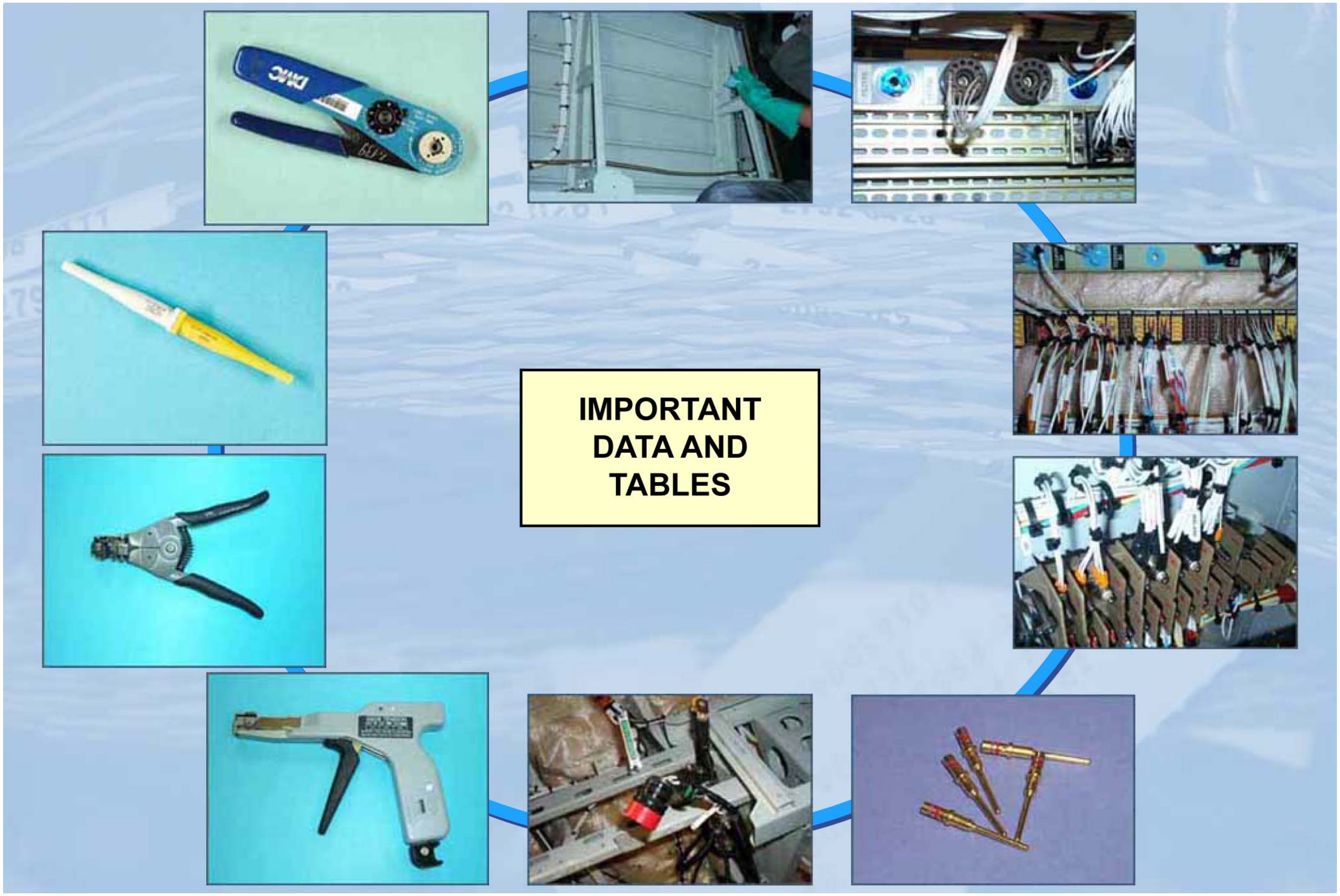
WHERE TO FIND THE METHODS OF REPAIRS?

IMPORTANT DATA TABLE

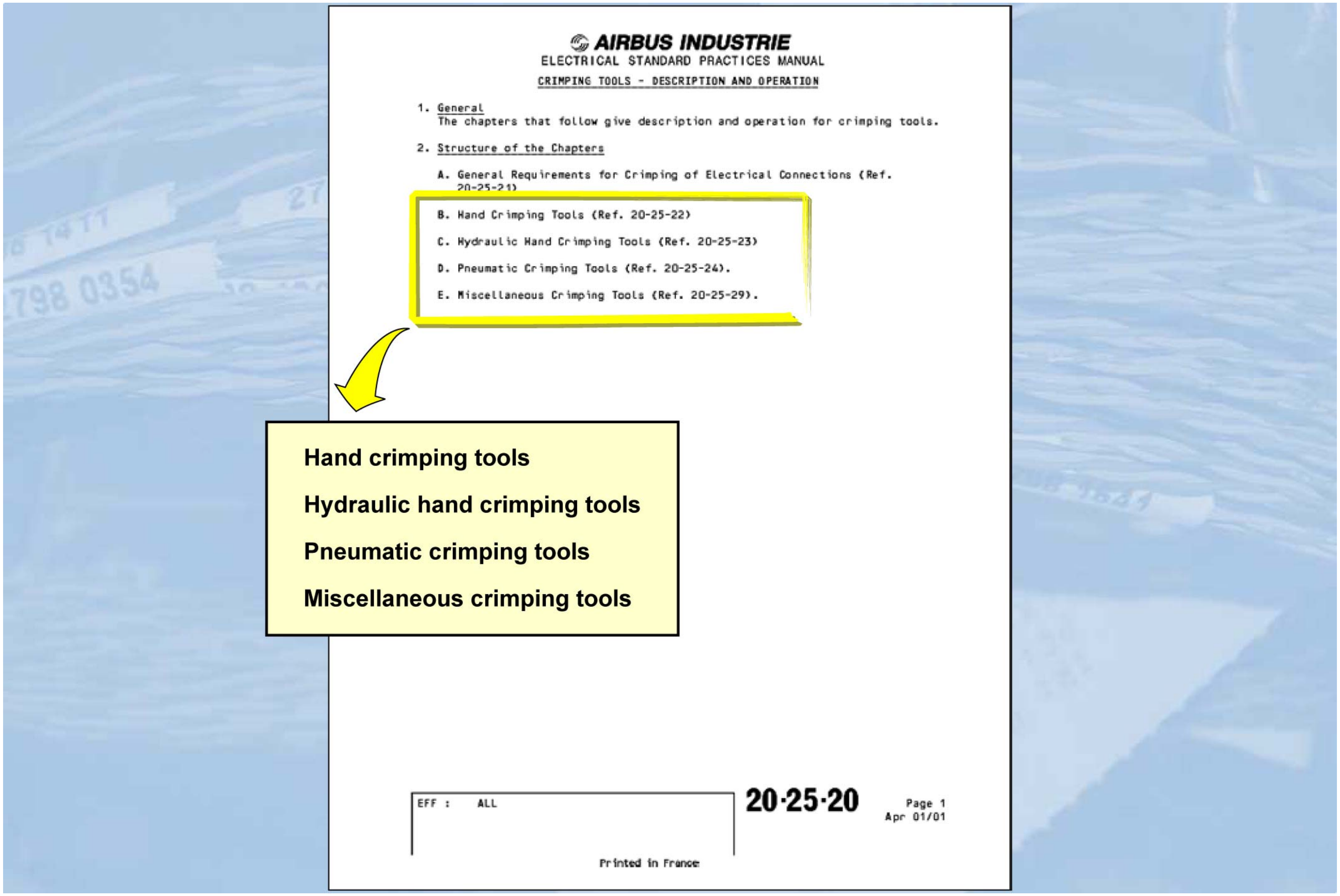
SOME IMPORTANT DATA AND TABLES

Now, as a second part of this module, we will take a look at some important data and tables.
Crimp tools; insertion/extraction tools; wire insulation removal tools; electrical cable binding; wire type codes and part number identification; connective devices types and contacts; terminal blocks and terminations, terminal blocks modules; grounding modules and contacts and finally cleaning procedures.
Detailed information on the crimping tools is depicted in the tool chapter.
As you can see, there are different types of crimping tools.
To achieve a proper crimping operation, you have to refer to the general requirement for crimping of electric connection.
There is all the necessary information concerning the pre-crimping checks and, the post-crimping checks.
Concerning the stripping tools chapter, there is an explanation on how to strip different wires type: single core wires or multi core cable.
Details on the stripping procedure.
Detail on the stripping procedure with scalpels, cutter or equivalent tool.
Typical defects representation.
Information on procedure to replace dies of a stripping tool.
Insertion and extraction tools.
The tooling chapter also gives information on the insertion/extraction tools.
When you insert the contact with the tool, the collars retract the clips and when fully inserted the clips lock the contact. Now you can remove the tool.
Always check the correct locking of the contact, by lightly pulling the cable rearward.
When you extract a contact, you must push with the non-colored (white) part of the tool on the front stop.
The clips retract and allow you to extract the contact, by holding wire and tool together.
To conclude this insertion/extraction procedure, keep in mind that it is mandatory to check if the contacts are correctly locked, because of the risk of intermittent contact.
Be aware that if you don't have the tool part number, it is possible to get an equivalence in the equivalence table of the tooling chapter (20-25-XX).
Cable binding tool.
The wiring tools (guns) are used for cables attachment to form bundles.
They are used for installation of cable ties NSA935401, for example.
Depending on cable tie dimensions, you have different adjustment and part number to select.
For example, the GS4H gun is used for cable tie size 4.6 to 8.9 millimeters.
The selector knob is used for the tension pre-selection.
The typical procedure to install a cable tie is to:
- Put the cable tie around the bundle,
- Engage the free end of the cable tie into the locking head,
- Pull the trigger.

When tension is OK, the cable tie is automatically cut and the tie end is ejected.
To make sure that the tightening of the tie cable is correct, check the installation as shown on this figure.
To remove a cable tie with plastic tab, you must shear the locking head without damaging the cables.
To remove a cable tie with metallic tab (used before 1991), you must cut the cable tie with scissors held parallel to the cables so that the metallic tab does not fall into the bundle.



SOME IMPORTANT DATA AND TABLES



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
CRIMPING TOOLS - DESCRIPTION AND OPERATION

1. General
   The chapters that follow give description and operation for crimping tools.

2. Structure of the Chapters

   A. General Requirements for Crimping of Electrical Connections (Ref. 20-25-21)

   B. Hand Crimping Tools (Ref. 20-25-22)

   C. Hydraulic Hand Crimping Tools (Ref. 20-25-23)

   D. Pneumatic Crimping Tools (Ref. 20-25-24).

   E. Miscellaneous Crimping Tools (Ref. 20-25-29).

EFF : ALL

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SOME IMPORTANT DATA AND TABLES

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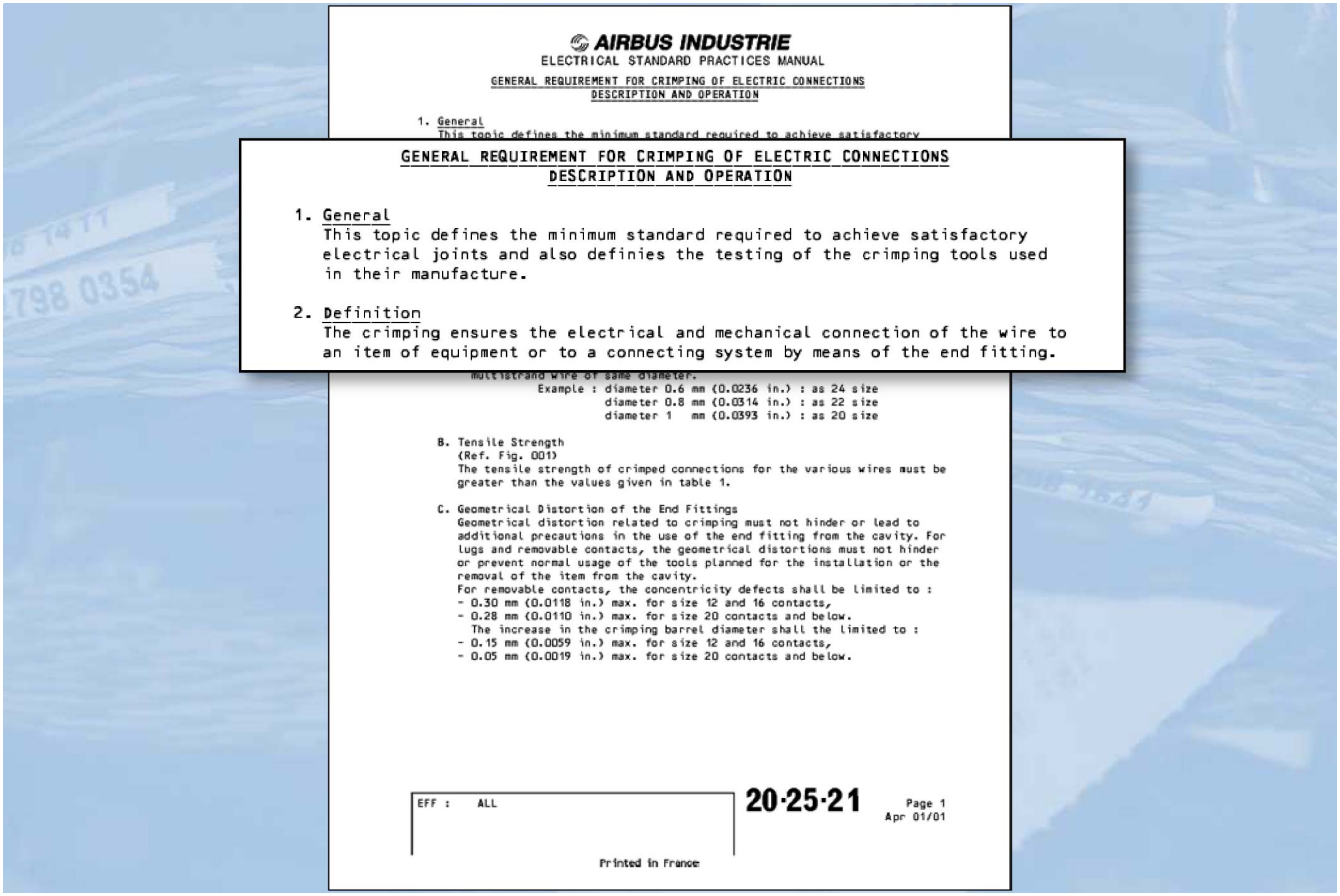

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ELECTRICAL STANDARD PRACTICES MANUAL

GENERAL REQUIREMENT FOR CRIMPING OF ELECTRIC CONNECTIONS
DESCRIPTION AND OPERATION

1. General
This topic defines the minimum standard required to achieve satisfactory

GENERAL REQUIREMENT FOR CRIMPING OF ELECTRIC CONNECTIONS
DESCRIPTION AND OPERATION

1. General
This topic defines the minimum standard required to achieve satisfactory electrical joints and also definies the testing of the crimping tools used in their manufacture.

2. Definition
The crimping ensures the electrical and mechanical connection of the wire to an item of equipment or to a connecting system by means of the end fitting.

multistrand wire of same diameter.
Example : diameter 0.6 mm (0.0236 in.) : as 24 size
diameter 0.8 mm (0.0314 in.) : as 22 size
diameter 1 mm (0.0393 in.) : as 20 size

B. Tensile Strength
(Ref. Fig. 001)
The tensile strength of crimped connections for the various wires must be greater than the values given in table 1.

C. Geometrical Distortion of the End Fittings
Geometrical distortion related to crimping must not hinder or lead to additional precautions in the use of the end fitting from the cavity. For lugs and removable contacts, the geometrical distortions must not hinder or prevent normal usage of the tools planned for the installation or the removal of the item from the cavity.
For removable contacts, the concentricity defects shall be limited to :
- 0.30 mm (0.0118 in.) max. for size 12 and 16 contacts,
- 0.28 mm (0.0110 in.) max. for size 20 contacts and below.
The increase in the crimping barrel diameter shall the limited to :
- 0.15 mm (0.0059 in.) max. for size 12 and 16 contacts,
- 0.05 mm (0.0019 in.) max. for size 20 contacts and below.

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SOME IMPORTANT DATA AND TABLES

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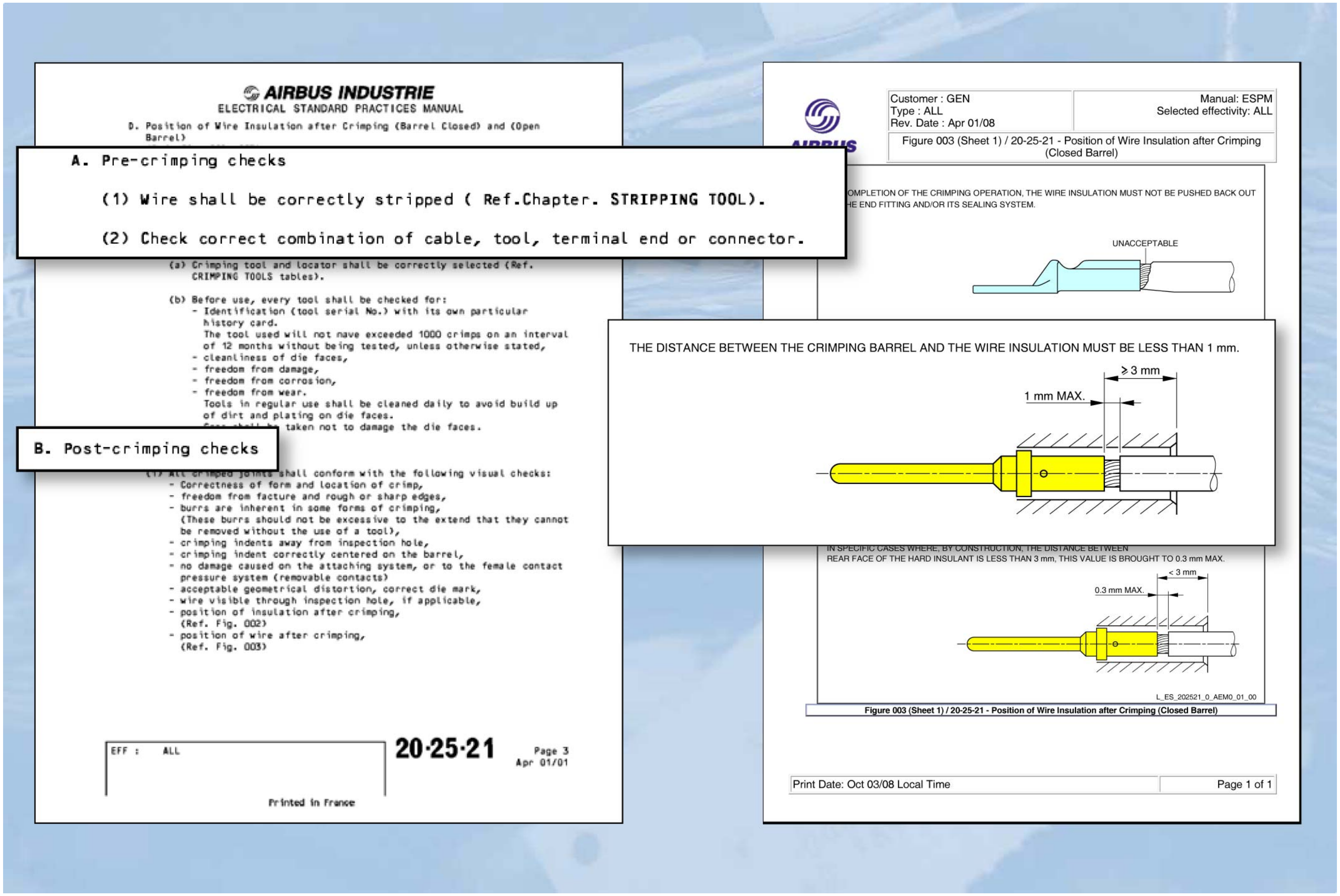

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D. Position of Wire Insulation after Crimping (Barrel Closed) and (Open Barrel)

A. Pre-crimping checks

(1) Wire shall be correctly stripped (Ref.Chapter. STRIPPING TOOL).

(2) Check correct combination of cable, tool, terminal end or connector.

(a) Crimping tool and locator shall be correctly selected (Ref. CRIMPING TOOLS tables).

(b) Before use, every tool shall be checked for:
- Identification (tool serial No.) with its own particular history card.
The tool used will not have exceeded 1000 crimps on an interval of 12 months without being tested, unless otherwise stated,
- cleanliness of die faces,
- freedom from damage,
- freedom from corrosion,
- freedom from wear.
Tools in regular use shall be cleaned daily to avoid build up of dirt and plating on die faces.
Care shall be taken not to damage the die faces.

B. Post-crimping checks

(1) All crimped joints shall conform with the following visual checks:
- Correctness of form and location of crimp,
- freedom from facture and rough or sharp edges,
- burrs are inherent in some forms of crimping, (These burrs should not be excessive to the extend that they cannot be removed without the use of a tool),
- crimping indents away from inspection hole,
- crimping indent correctly centered on the barrel,
- no damage caused on the attaching system, or to the female contact pressure system (removable contacts)
- acceptable geometrical distortion, correct die mark,
- wire visible through inspection hole, if applicable,
- position of insulation after crimping, (Ref. Fig. 002)
- position of wire after crimping, (Ref. Fig. 003)

EFF : ALL
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Customer : GEN
Type : ALL
Rev. Date : Apr 01/08
Manual: ESPM
Selected effectivity: ALL
Figure 003 (Sheet 1) / 20-25-21 - Position of Wire Insulation after Crimping (Closed Barrel)

...OMPLETION OF THE CRIMPING OPERATION, THE WIRE INSULATION MUST NOT BE PUSHED BACK OUT ...HE END FITTING AND/OR ITS SEALING SYSTEM.

THE DISTANCE BETWEEN THE CRIMPING BARREL AND THE WIRE INSULATION MUST BE LESS THAN 1 mm.

IN SPECIFIC CASES WHERE, BY CONSTRUCTION, THE DISTANCE BETWEEN REAR FACE OF THE HARD INSULANT IS LESS THAN 3 mm, THIS VALUE IS BROUGHT TO 0.3 mm MAX.

Figure 003 (Sheet 1) / 20-25-21 - Position of Wire Insulation after Crimping (Closed Barrel)

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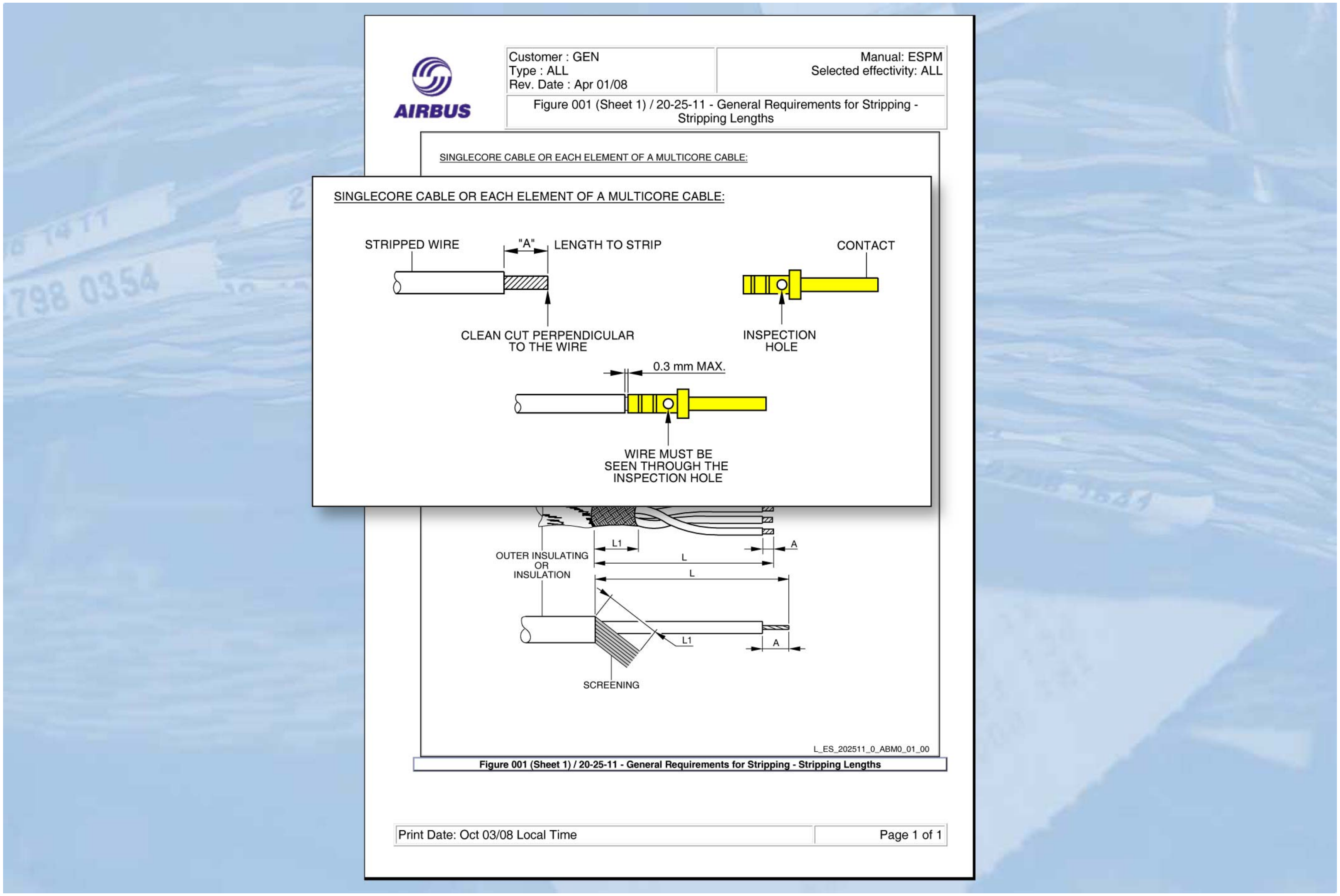
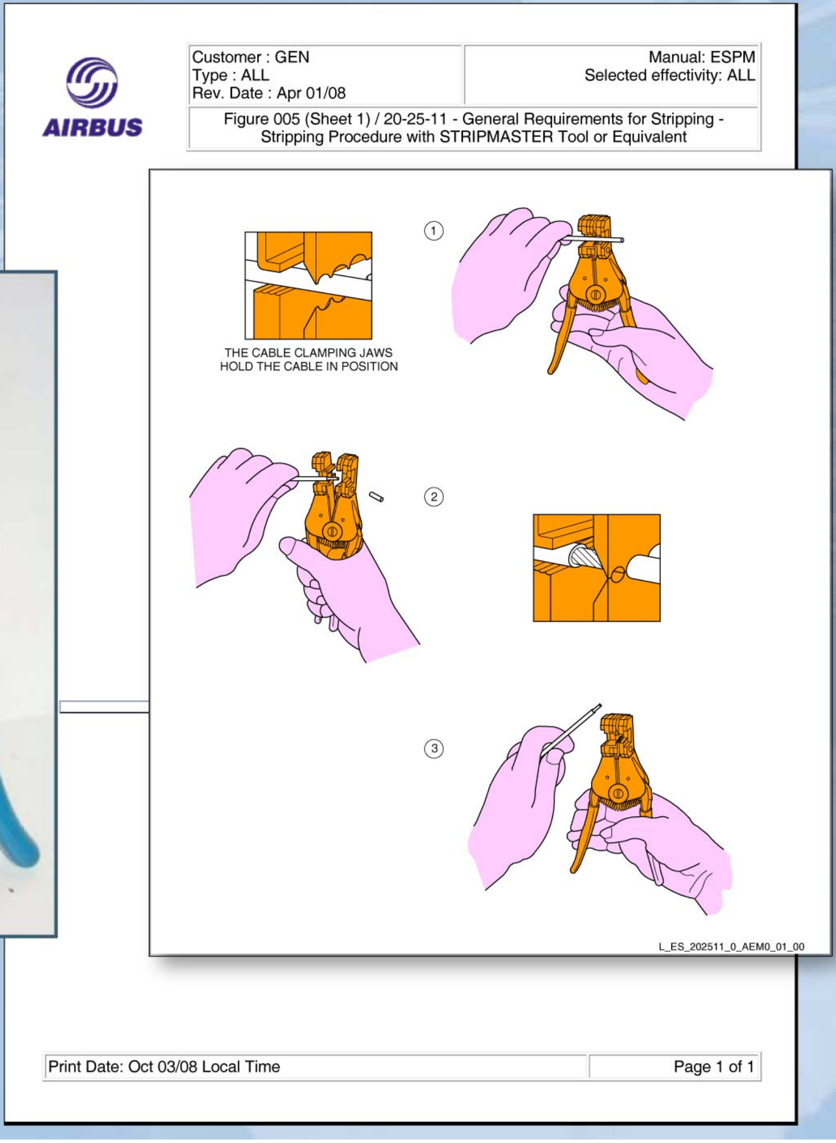
Page 1 of 1

SOME IMPORTANT DATA AND TABLES



SOME IMPORTANT DATA AND TABLES



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 005 (Sheet 1) / 20-25-11 - General Requirements for Stripping - Stripping Procedure with STRIPMASTER Tool or Equivalent

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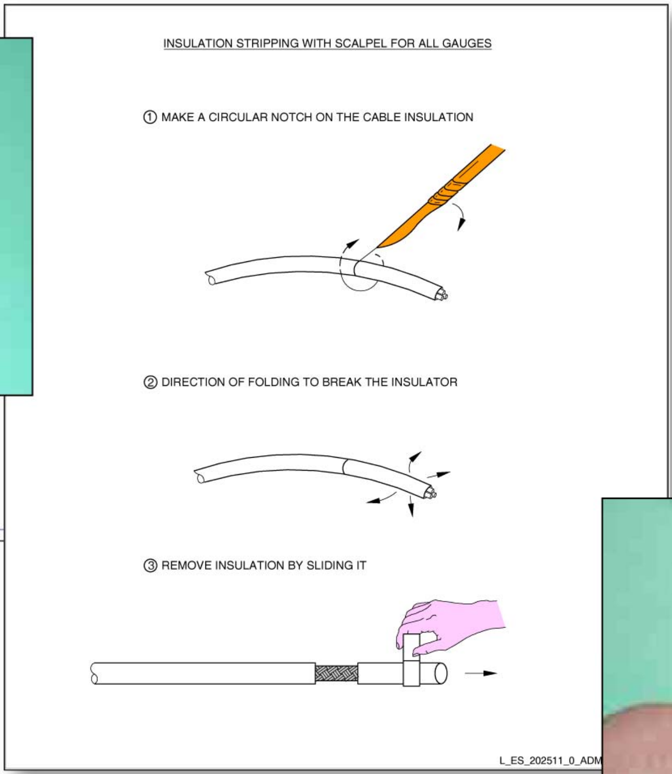
SOME IMPORTANT DATA AND TABLES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 003 (Sheet 1) / 20-25-11 - General Requirements for Stripping - Insulation Stripping with Scalpels, Cutters or Equivalent Tool	



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SOME IMPORTANT DATA AND TABLES

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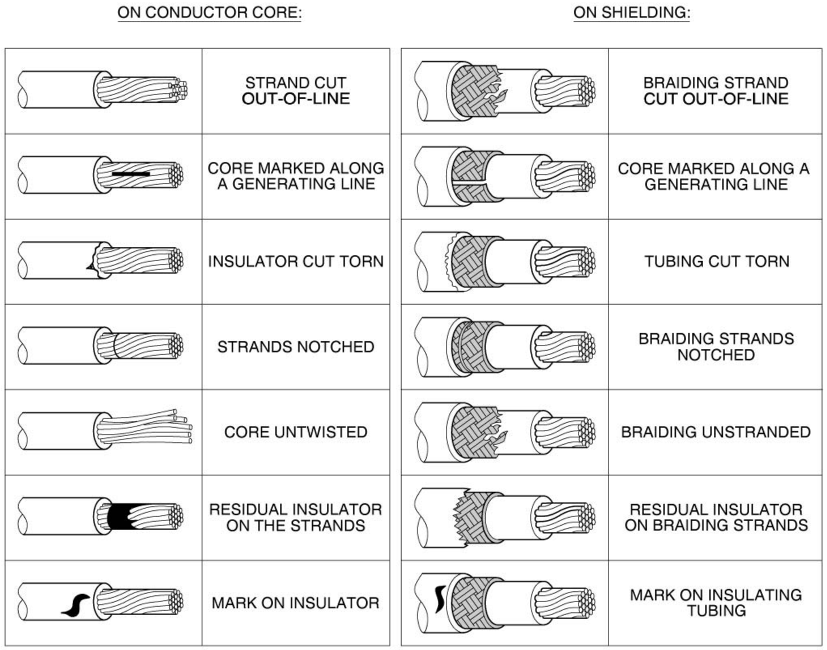
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 006 (Sheet 1) / 20-25-11 - General Requirements for Stripping - Representation of Unacceptable Stripping Defects



NOTE: THE ABOVE SKETCHES, SHOWING A SINGLECORE CABLE, ALSO APPLY TO MULTICORE CABLES AND COAXIAL CABLES.

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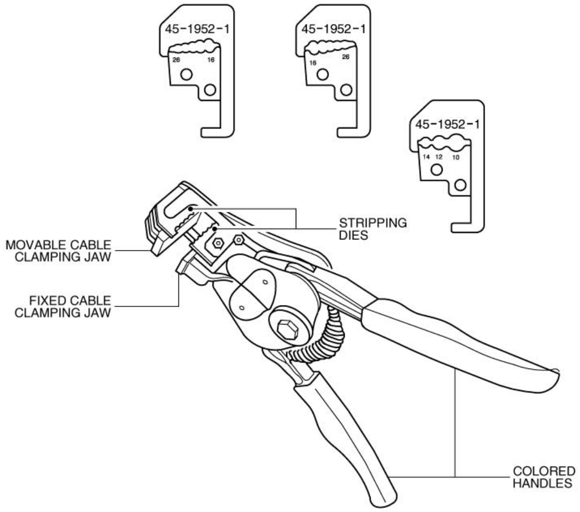
SOME IMPORTANT DATA AND TABLES

X8U08481 - X0332T0 - XM2010000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-25-12 - Stripping Tools - STRIPMASTER Tool or Equivalent	



NOTE: WHEN IT IS NECESSARY TO CHANGE THE DIES, YOU MUST ALWAYS CHANGE THE TWO PARTS. AFTER YOU CHANGE THE DIES, SAMPLES MUST BE MADE AND EXAMINED.

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Figure 002 (Sheet 1) / 20-25-12 - Stripping Tools - STRIPMASTER Tool or Equivalent

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SOME IMPORTANT DATA AND TABLES

X8U08481 - X0332T0 - XM2010000000001

SOME IMPORTANT DATA AND TABLES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-25-41 - Insertion/Extraction Tools - Connector Cavity

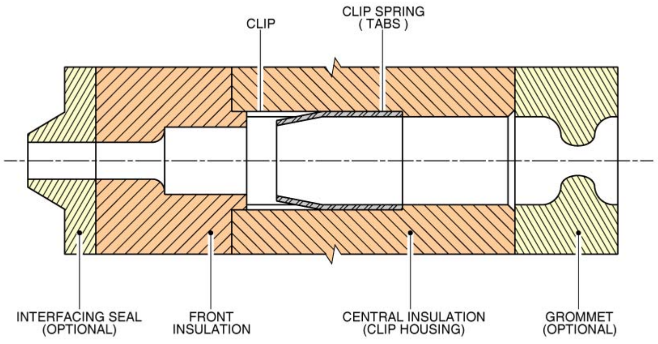

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Figure 001 (Sheet 1) / 20-25-41 - Insertion/Extraction Tools - Connector Cavity

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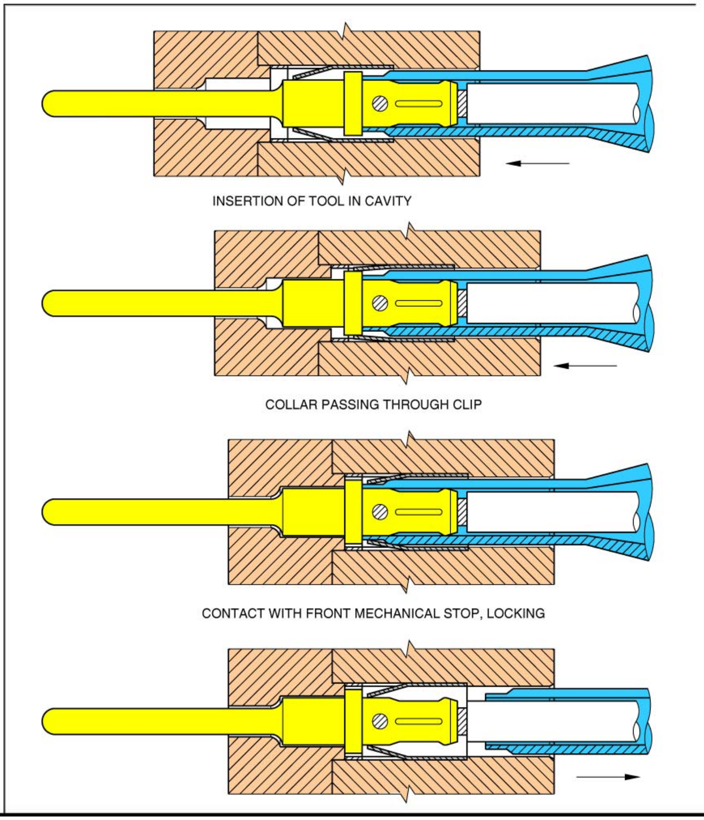
SOME IMPORTANT DATA AND TABLES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-25-41 - Insertion of Contacts with Tool



CAUTION : MANDATORY CHECKS SHALL BE MADE FOR CORRECT LOCKING OF THE CONTACT BY LIGHTLY PULLING THE CABLE REARWARDS.
NO SIGNIFICANT MOVEMENT MUST BE FELT, OTHERWISE, THE INSERTION OPERATION MUSTBE REPEATED.

SOME IMPORTANT DATA AND TABLES

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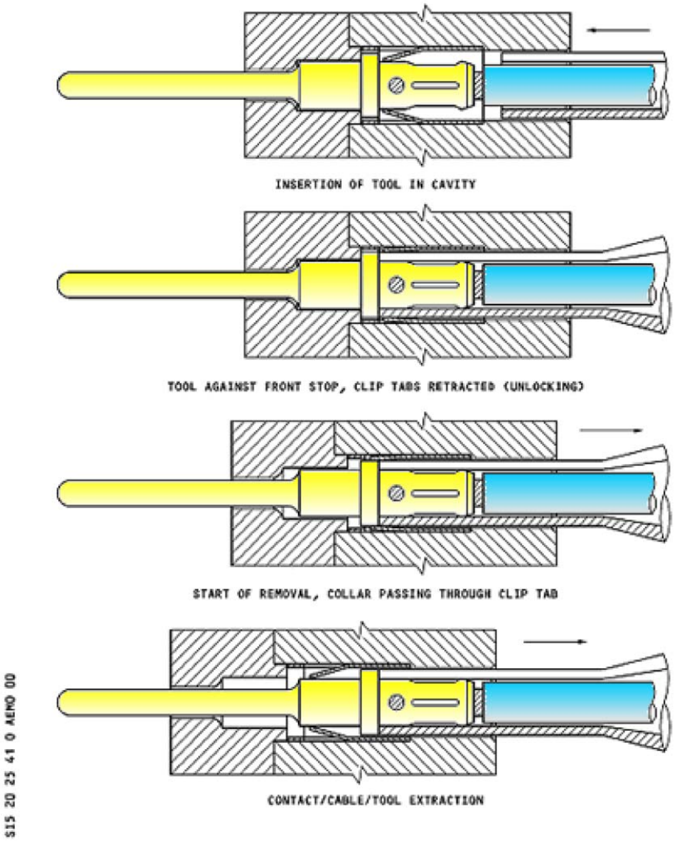

Extraction of Wired Contacts
Figure 003

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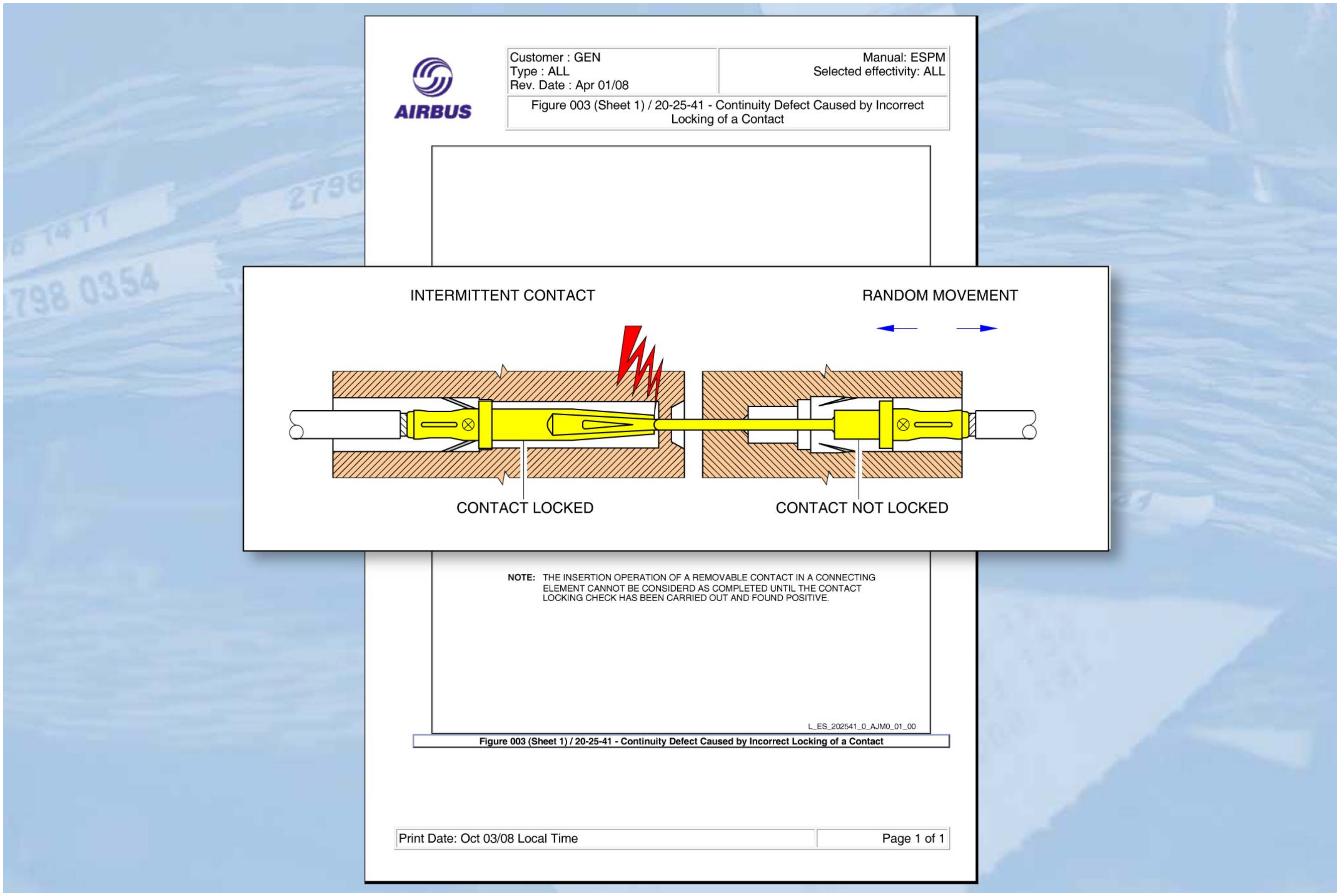

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 003 (Sheet 1) / 20-25-41 - Continuity Defect Caused by Incorrect Locking of a Contact	

NOTE: THE INSERTION OPERATION OF A REMOVABLE CONTACT IN A CONNECTING ELEMENT CANNOT BE CONSIDERD AS COMPLETED UNTIL THE CONTACT LOCKING CHECK HAS BEEN CARRIED OUT AND FOUND POSITIVE.

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Figure 003 (Sheet 1) / 20-25-41 - Continuity Defect Caused by Incorrect Locking of a Contact

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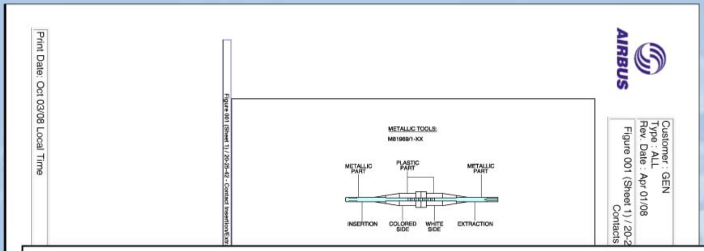
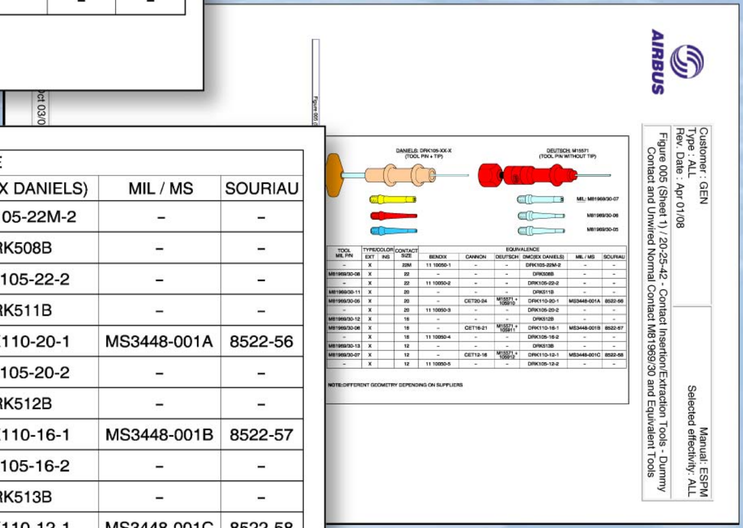
SOME IMPORTANT DATA AND TABLES



TOOL MIL P/N	TYPE/COLOR		CONTACT SIZE	EQUIVALENCE						
	EXT	INS		AMP	CANNON	DMC (EX DANIELS)		MIL / MS	RADIALL	
M81969/1-01	WHITE	GREEN	22	91066-1	-	DRK223-22	DAK223-22	MS3156-22	282 880	282 890
M81969/1-02	WHITE	RED	20	91066-2	CET20-8	DRK145	DAK145	M24308/18-2 OR MS3156-20	282 881	282 891
M81969/1-03	WHITE	BLUE	16	91066-3	CET16-9	DRK83-16	DAK83-16	M24308/18-3 OR MS3156-16	282 929	282 892
M81969/1-04	WHITE	GREEN	22M	91067-1	-	DRK95-22 M	DAK95-22 M	M24308/18-1	-	-

NOTE: DIFFERENT GEOMETRY DEPENDING ON SUPPLIERS



TOOL MIL P/N	TYPE/COLOR		CONTACT SIZE	EQUIVALENCE					
	EXT	INS		BENDIX	CANNON	DEUTSCH	DMC(EX DANIELS)	MIL / MS	SOURIAU
-	X		22M	11 10050-1	-	-	DRK105-22M-2	-	-
M81969/30-08	X		22	-	-	-	DRK508B	-	-
-	X		22	11 10050-2	-	-	DRK105-22-2	-	-
M81969/30-11	X		20	-	-	-	DRK511B	-	-
M81969/30-05	X		20	-	CET20-24	M15571 + 105910	DRK110-20-1	MS3448-001A	8522-56
-	X		20	11 10050-3	-	-	DRK105-20-2	-	-
M81969/30-12	X		16	-	-	-	DRK512B	-	-
M81969/30-06	X		16	-	CET16-21	M15571 + 105911	DRK110-16-1	MS3448-001B	8522-57
-	X		16	11 10050-4	-	-	DRK105-16-2	-	-
M81969/30-13	X		12	-	-	-	DRK513B	-	-
M81969/30-07	X		12	-	CET12-16	M15571 + 105912	DRK110-12-1	MS3448-001C	8522-58
-	X		12	11 10050-5	-	-	DRK105-12-2	-	-

NOTE: DIFFERENT GEOMETRY DEPENDING ON SUPPLIERS

SOME IMPORTANT DATA AND TABLES

CABLE BINDING TOOL

SOME IMPORTANT DATA AND TABLES

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WIRING TOOL (GUNS) - DESCRIPTION AND OPERATION

1. General

This topic gives the description and the procedure for wiring tools.
Wiring tools used to attach the wire have the reference below :
- GS2B,
- GS4H,
- MARK III (or MK3),
- P46,
- WT193.

2. Definition

The wiring operation must attach the cables together to form the bundles
relation to the requirements and rules of the routing.
This type of tool is used to install the tie wraps NSA935401.
(Refer to chapter on tie wraps 20-33-41).

3. Procedure

A. Characteristics
(Ref. Fig. 001, 002)

WIRING TOOL				TIE WRAP DIMENSION CODE WIDTH IN mm (in in.)			
MANUFACTURER	P/N	HANDLE COLOR	ADJUSTMENT	03 2.5mm (0.1in)	04 or 13 3.7mm (0.145in)	05,06 or 08 4.8mm (0.189in)	10 or 12 7.6/8mm (0.311/ 0.315in)
PANDUIT	GS2B	BLACK	SELECTOR	MIN	INT	STD	-
			TENSION	1 to 3	3 to 5	6 to 8	-
	GS4H	RED	SELECTOR	-	-	STD	HYV
			TENSION	-	-	1 to 4	5 to 8
LEGRAND	P46 (32088)	-	TENSION	2	4	5	-
INSULOK	MARK III (MK 3)	-	TENSION	1 or 2	2 or 3	3 or 4	-

EFF : ALL

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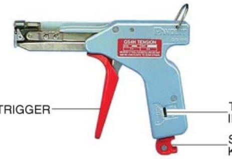
SOME IMPORTANT DATA AND TABLES

X8U08481 - X0332T0 - XM2010000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-25-51 - Wiring Tool (guns) - Description GS2B, GS4H (PANDUIT)	

PANDUIT GS4H:
HAND TOOL FOR 4.6 TO 8.9 mm (0.1811 TO 0.3503 in) WIDE STRAPS
GS4H-120:
FOR STRAP WIDTH OF MORE THAN 8.9 mm (0.3503 in)



SELECTOR KNOB: (FOR GS4H AND GS2B)
USED TO SELECT A PRESELECTED TENSION IN RELATION TO THE WIDTH OF THE TIE WRAP

FOR EACH WIDTH ADJUSMENT, YOU CAN TURN TO SELECT A MORE ACCURATE TENSION (CLOCKWISE TO INCREASE, ANTI-CLOCKWISE TO DECREASE)

PANDUIT GS2B:
HAND TOOL FOR 2.4 TO 4.8 mm (0.0944 TO 0.1889 in) WIDE STRAPS

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Figure 001 (Sheet 1) / 20-25-51 - Wiring Tool (guns) - Description GS2B, GS4H (PANDUIT)

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SOME IMPORTANT DATA AND TABLES

X8U08481 - X0332T0 - XM2010000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-33-44 - Tie-wraps - Description and Installation NSA935401

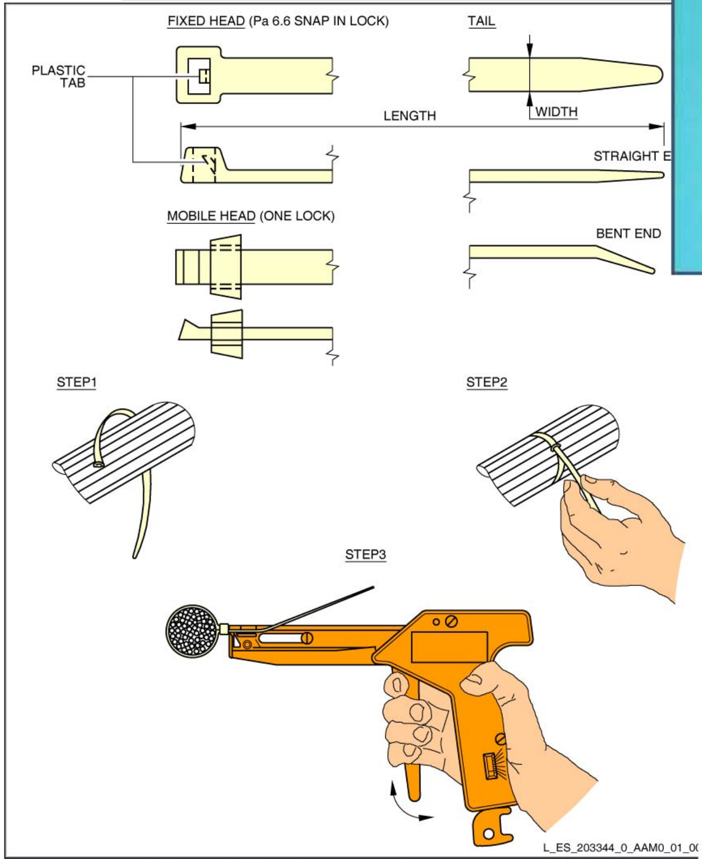

Figure 001 (Sheet 1) / 20-33-44 - Tie-wraps - Description and Installation NSA935401

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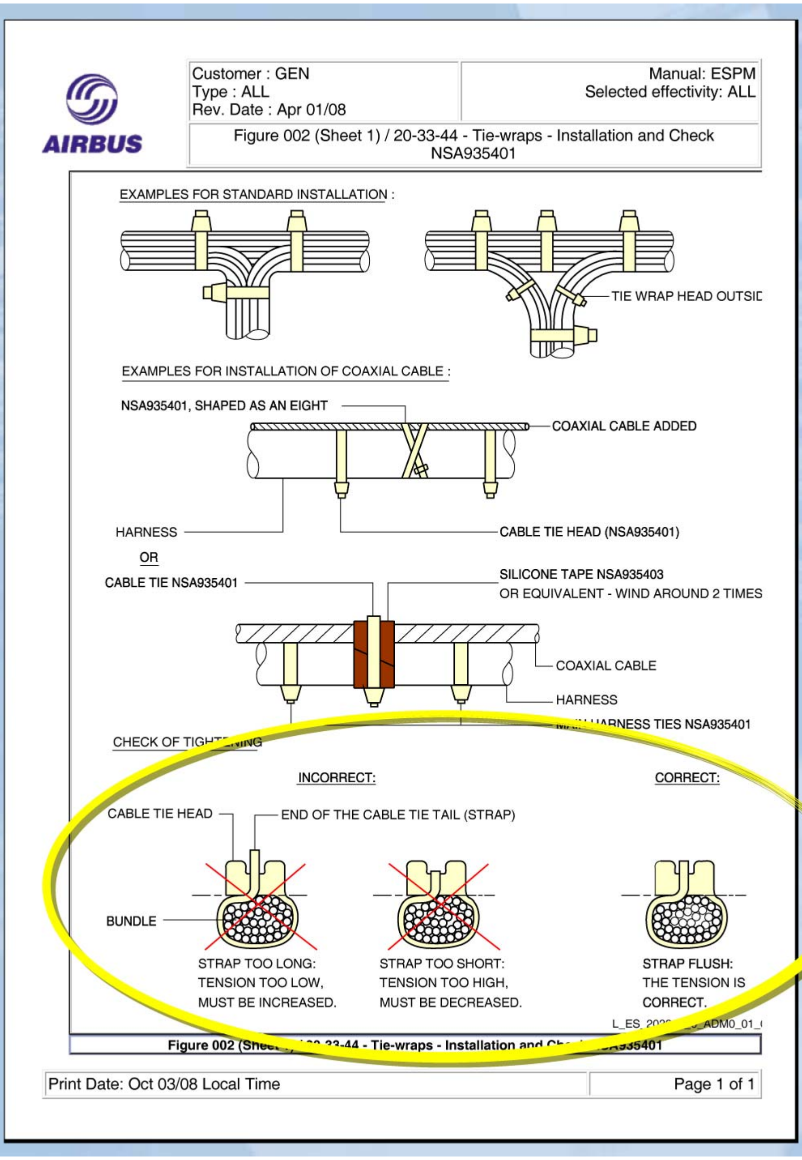
SOME IMPORTANT DATA AND TABLES

X8U08481 - X0332T0 - XM2010000000001



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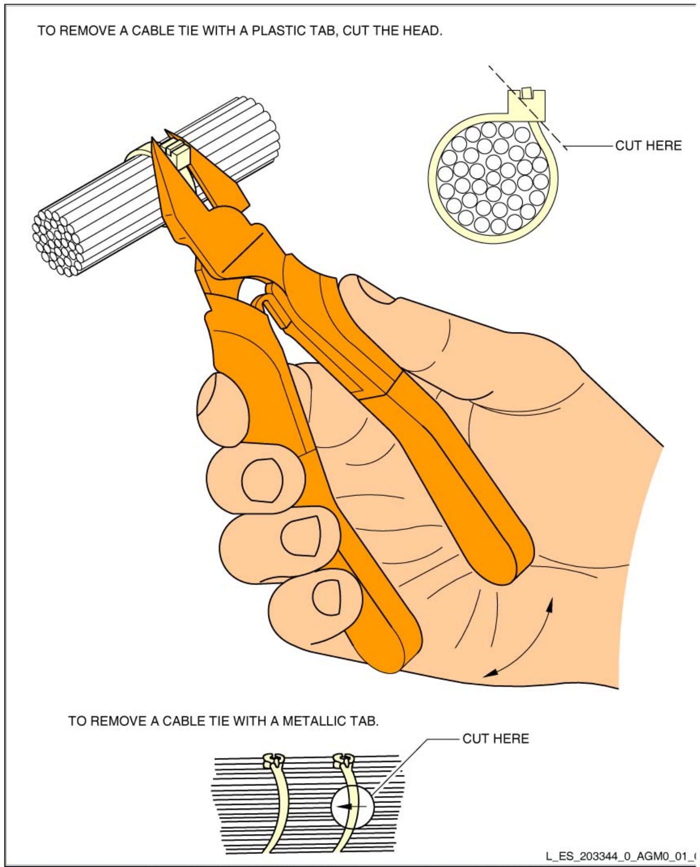
X8U08481 - X0332T0 - XM2010000000001



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-33-44 - Tie-wraps - Removal NSA935401

Figure 003 (Sheet 1) / 20-33-44 - Tie-wraps - Removal NSA935401

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SOME IMPORTANT DATA AND TABLES

SOME IMPORTANT DATA AND TABLES

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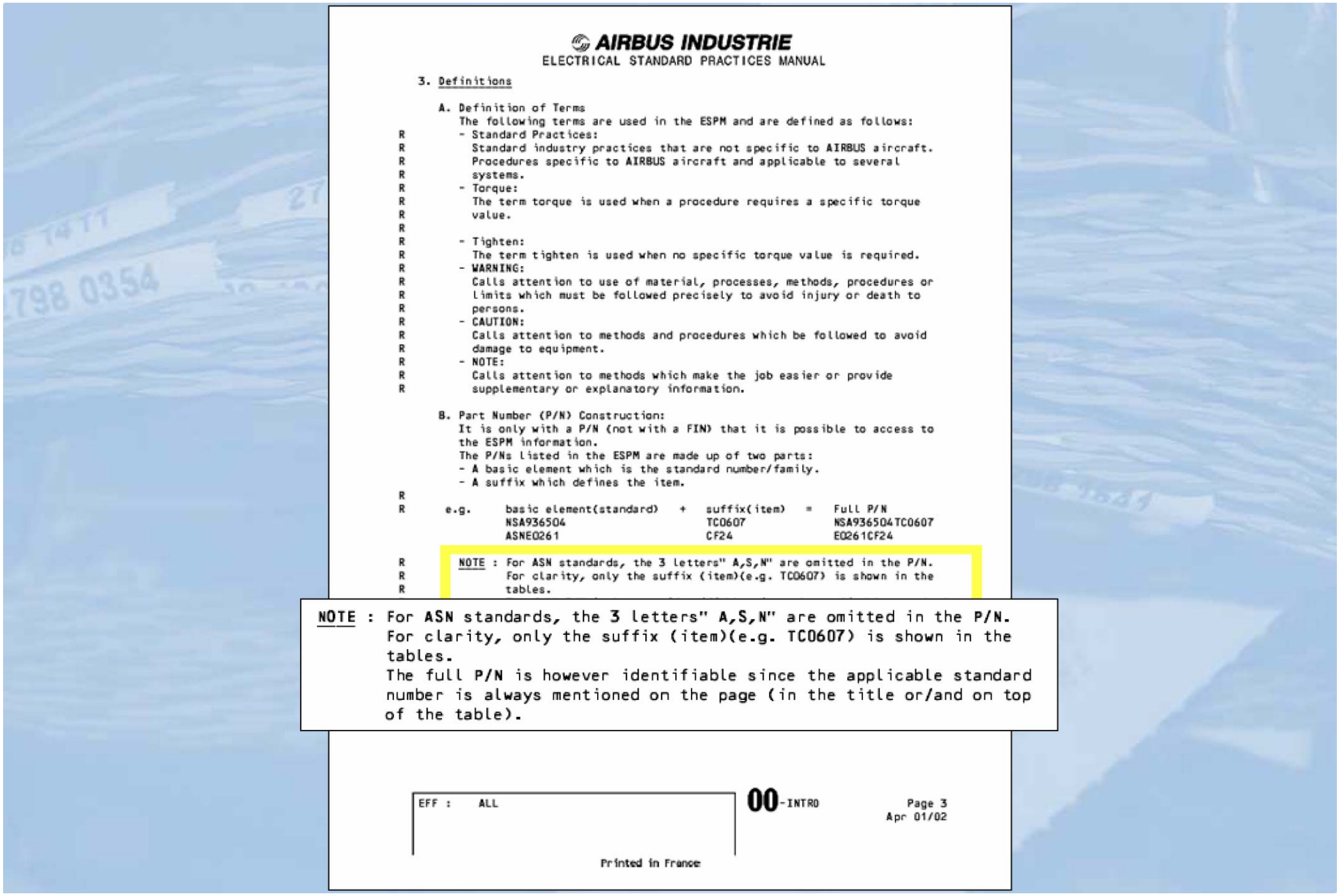
WIRING DIAGRAM MANUAL (WDM)

INTRODUCTION

Wiring Diagram Manual (WDM)
The WDM is subdivided into three manuals:
- ASM,
- AWM,
- AWL.

The ASM gives you blocks diagrams, simplified schematics, and schematics.
Consequently, the AWM is a help to identify precisely a failed component (a wire for example) when you make a search through TSM and ASM.
ASM is linked to AWM.
Aim of the AWM.
Consequently, the AWM is a help to identify precisely a failed component (a wire for example) when you make a search through TSM and ASM.
Aim of the AWL.
The lists are supplied as follows.
To resume...



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

3. Definitions

A. Definition of Terms
The following terms are used in the ESPM and are defined as follows:
- Standard Practices:
Standard industry practices that are not specific to AIRBUS aircraft.
Procedures specific to AIRBUS aircraft and applicable to several systems.
- Torque:
The term torque is used when a procedure requires a specific torque value.
- Tighten:
The term tighten is used when no specific torque value is required.
- WARNING:
Calls attention to use of material, processes, methods, procedures or limits which must be followed precisely to avoid injury or death to persons.
- CAUTION:
Calls attention to methods and procedures which be followed to avoid damage to equipment.
- NOTE:
Calls attention to methods which make the job easier or provide supplementary or explanatory information.

B. Part Number (P/N) Construction:
It is only with a P/N (not with a FIN) that it is possible to access to the ESPM information.
The P/Ns listed in the ESPM are made up of two parts:
- A basic element which is the standard number/family.
- A suffix which defines the item.

	basic element(standard)	+	suffix(item)	=	Full P/N
e.g.	NSA936504		TC0607		NSA936504TC0607
	ASNE0261		CF24		E0261CF24

NOTE : For ASN standards, the 3 letters" A,S,N" are omitted in the P/N. For clarity, only the suffix (item)(e.g. TC0607) is shown in the tables.

NOTE : For ASN standards, the 3 letters" A,S,N" are omitted in the P/N. For clarity, only the suffix (item)(e.g. TC0607) is shown in the tables.
The full P/N is however identifiable since the applicable standard number is always mentioned on the page (in the title or/and on top of the table).

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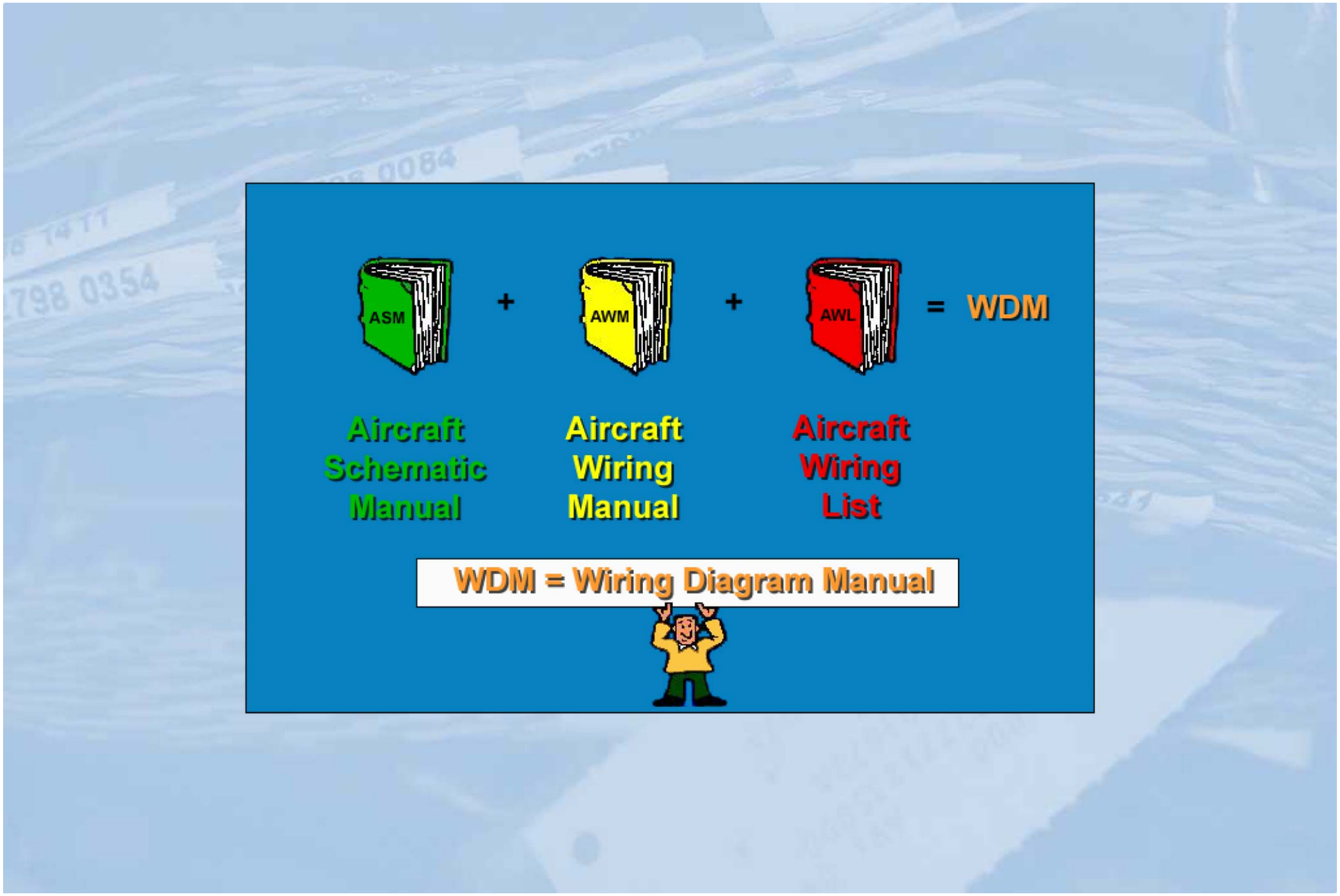
INTRODUCTION



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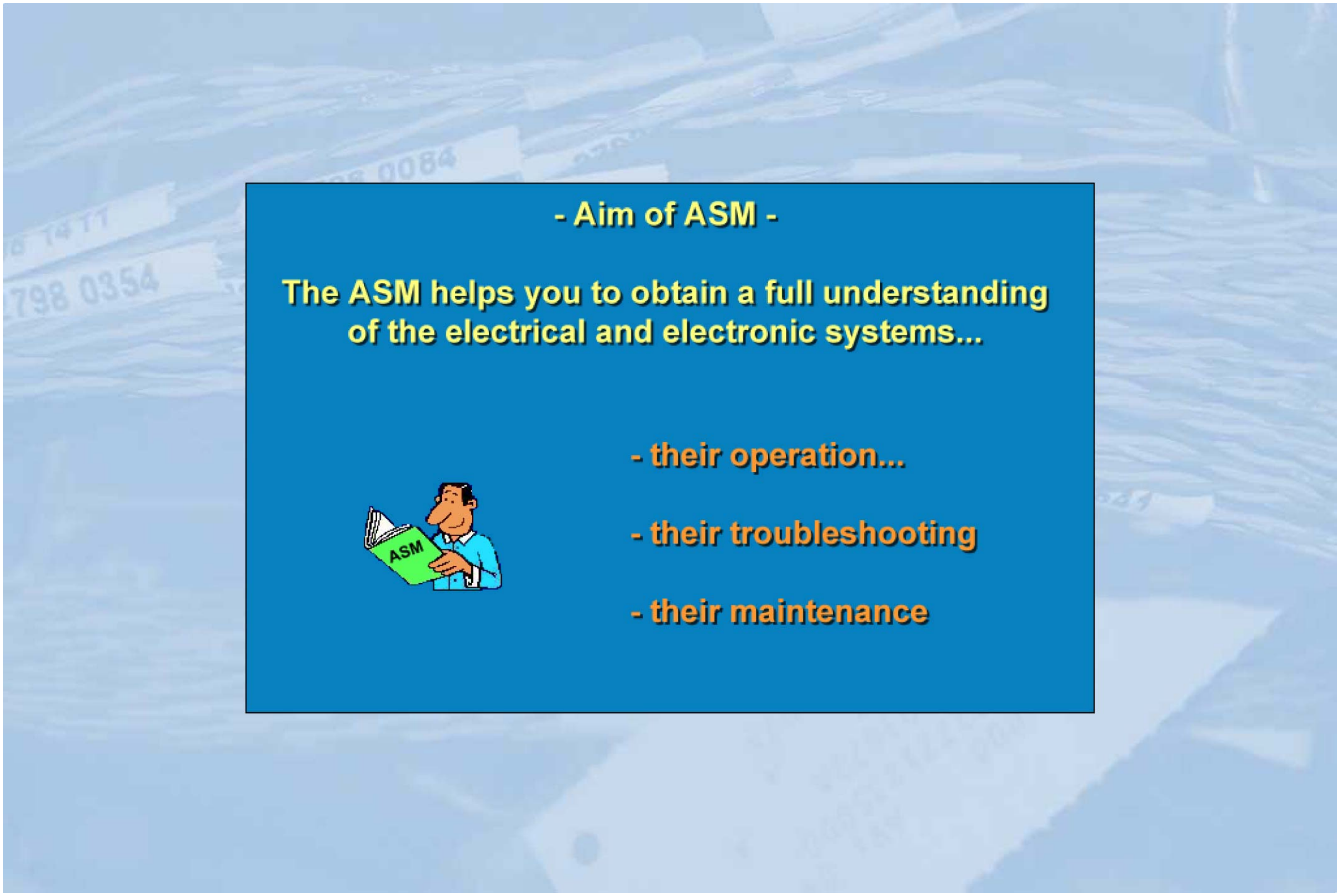

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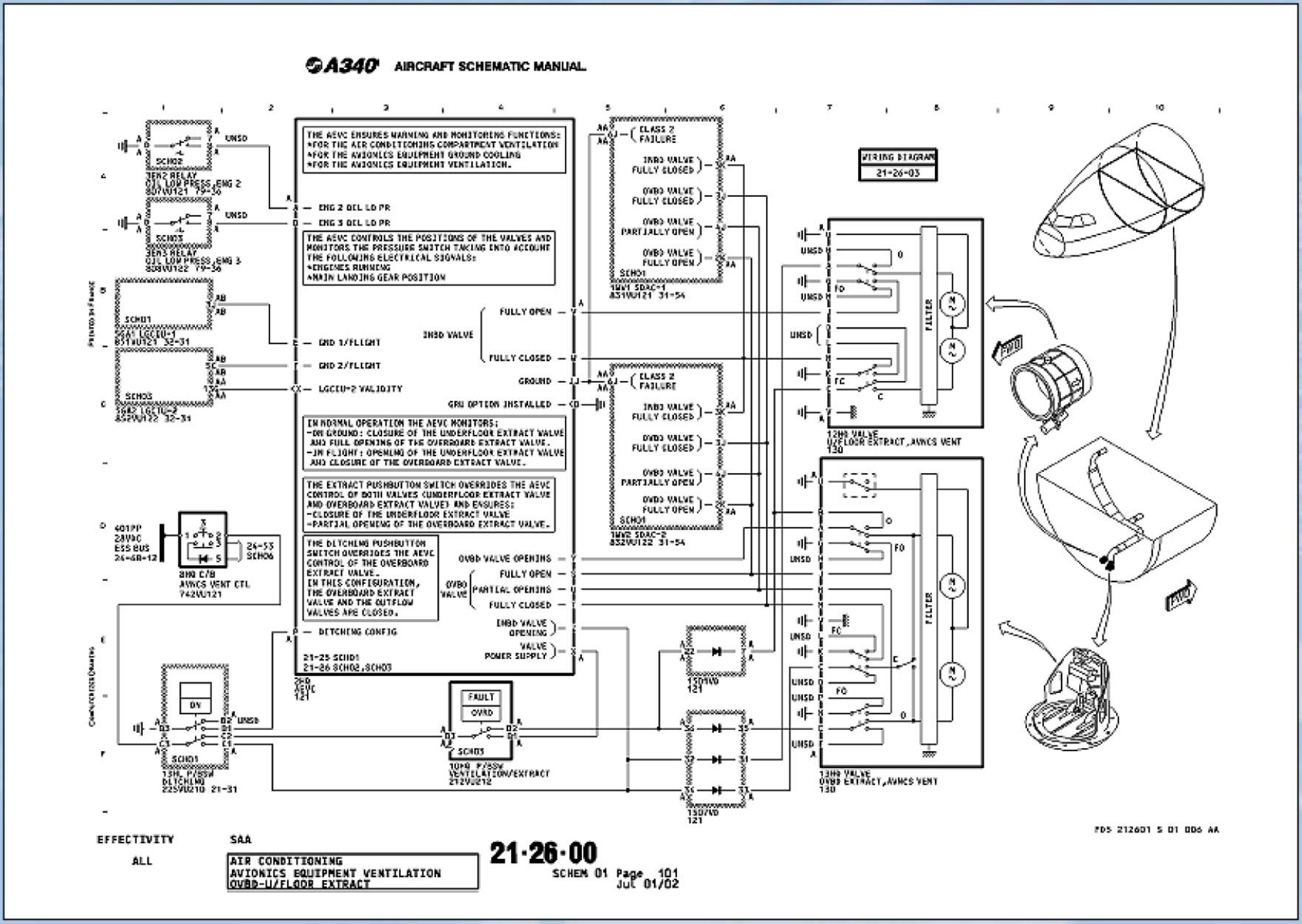

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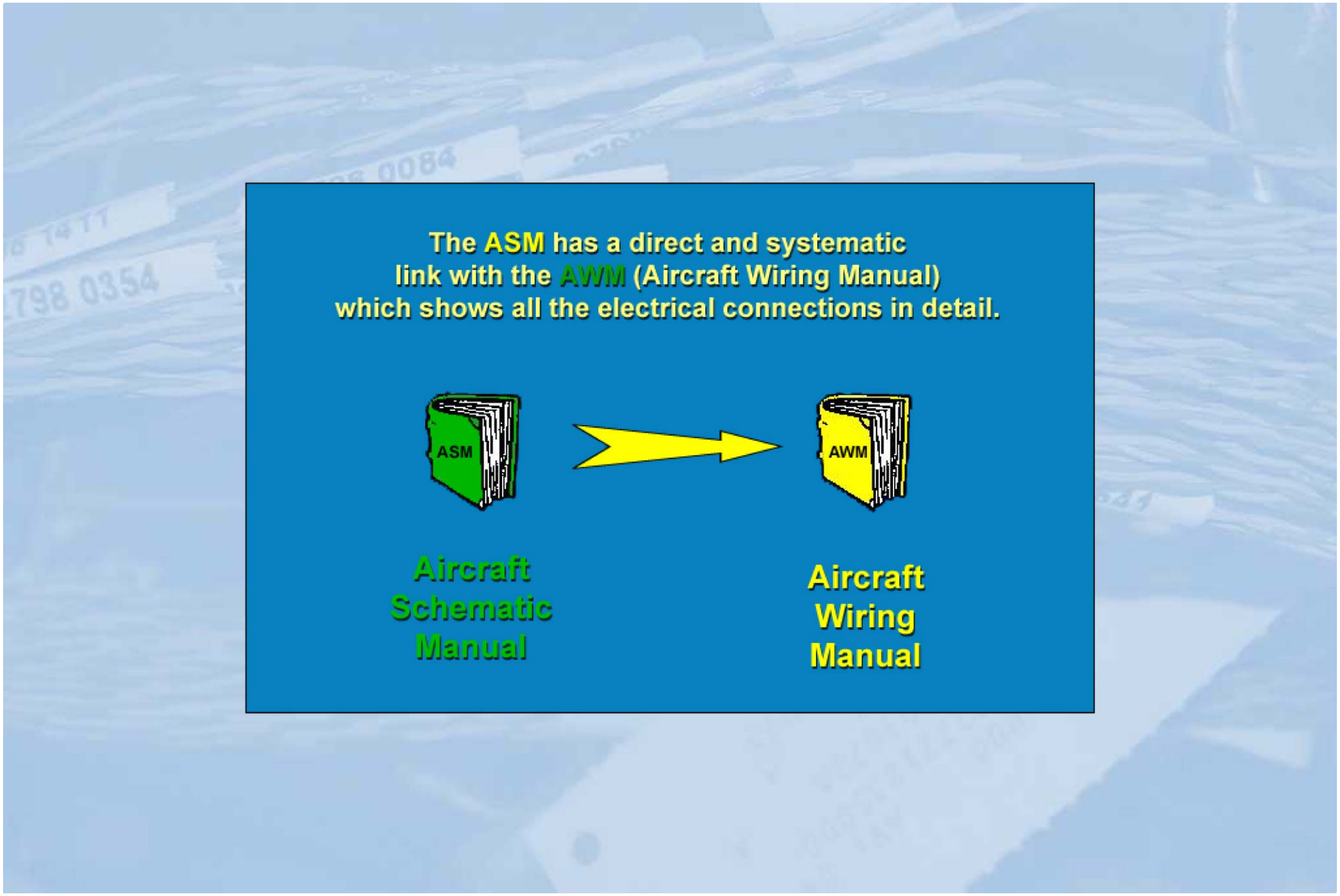
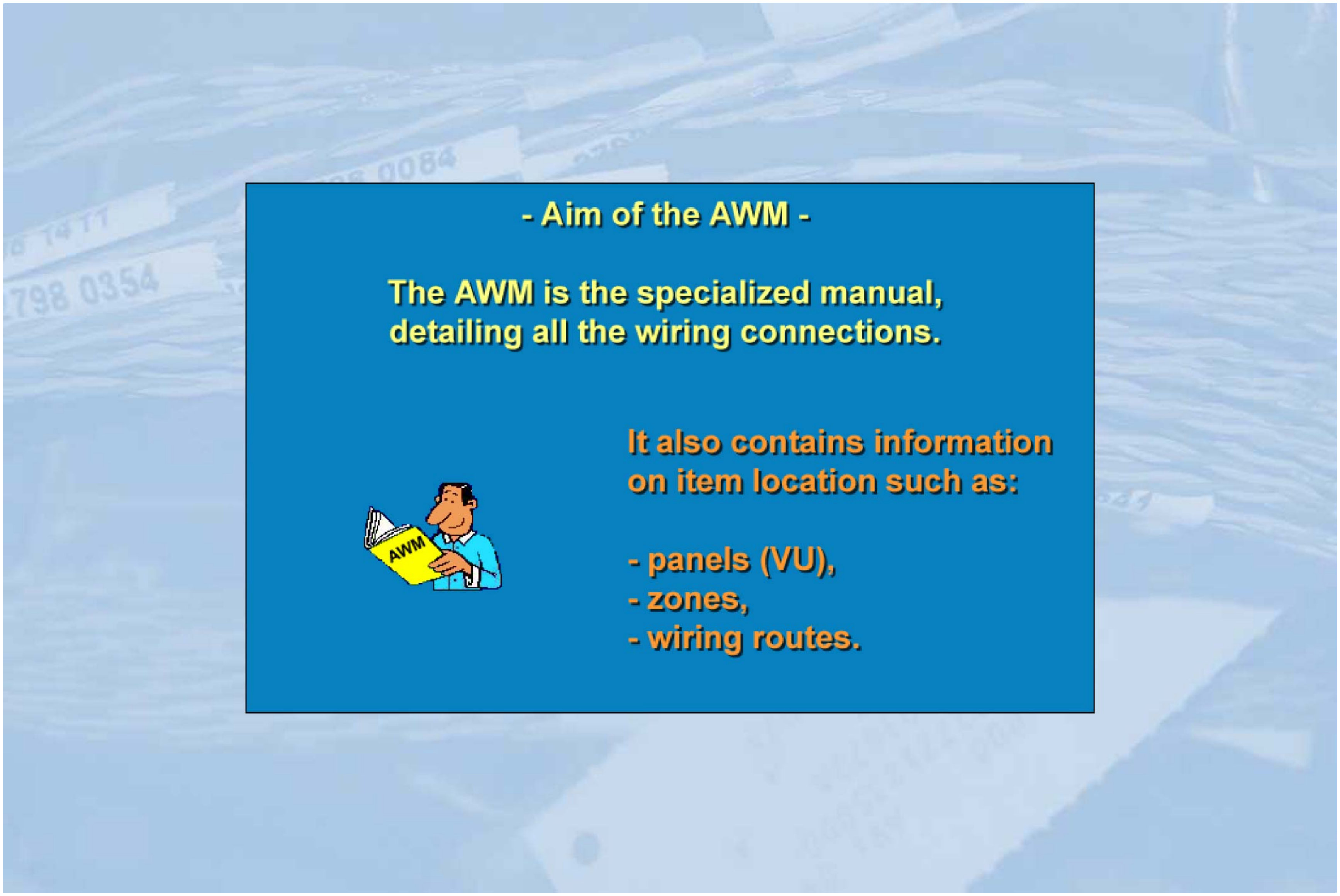
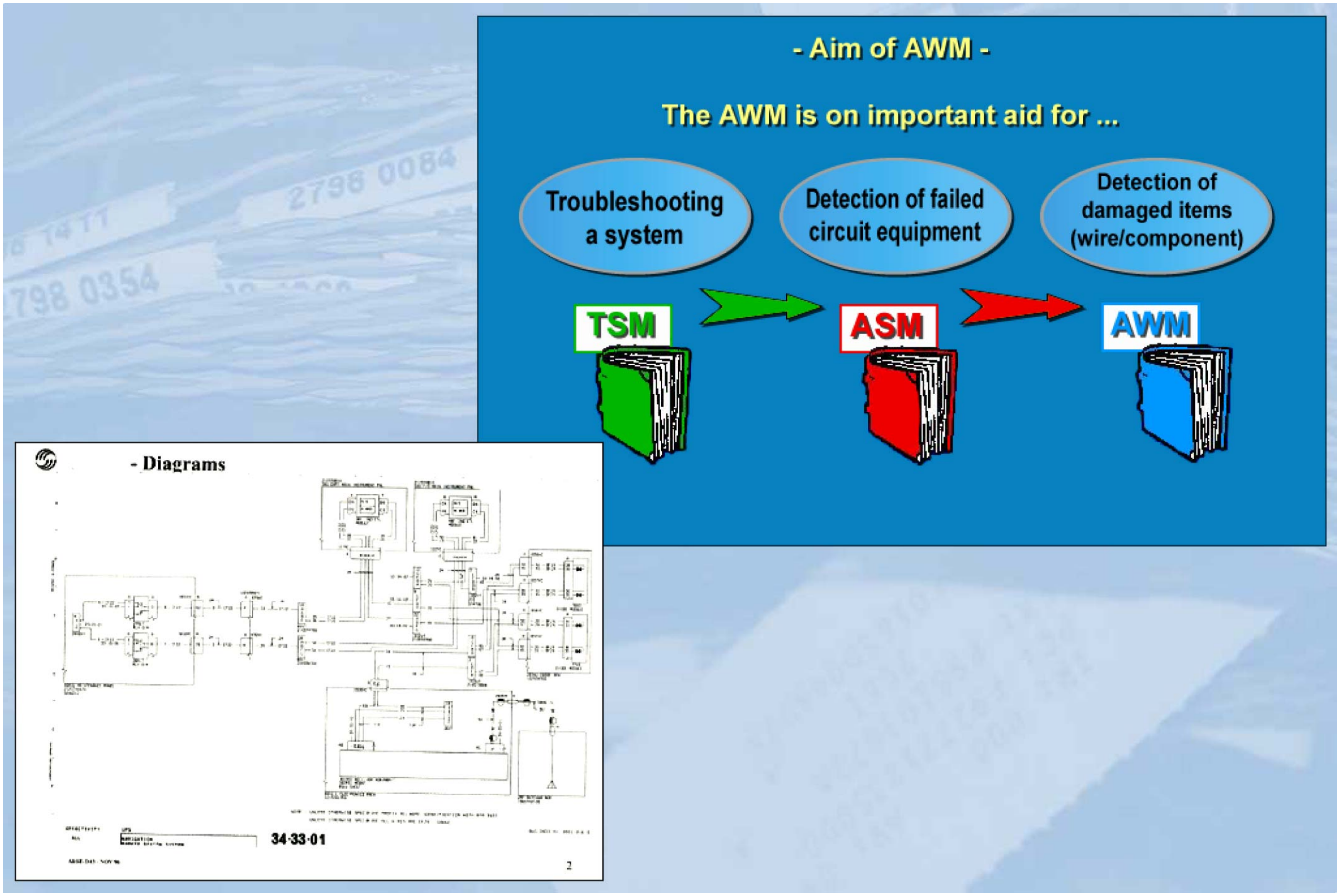


INTRODUCTION



INTRODUCTION



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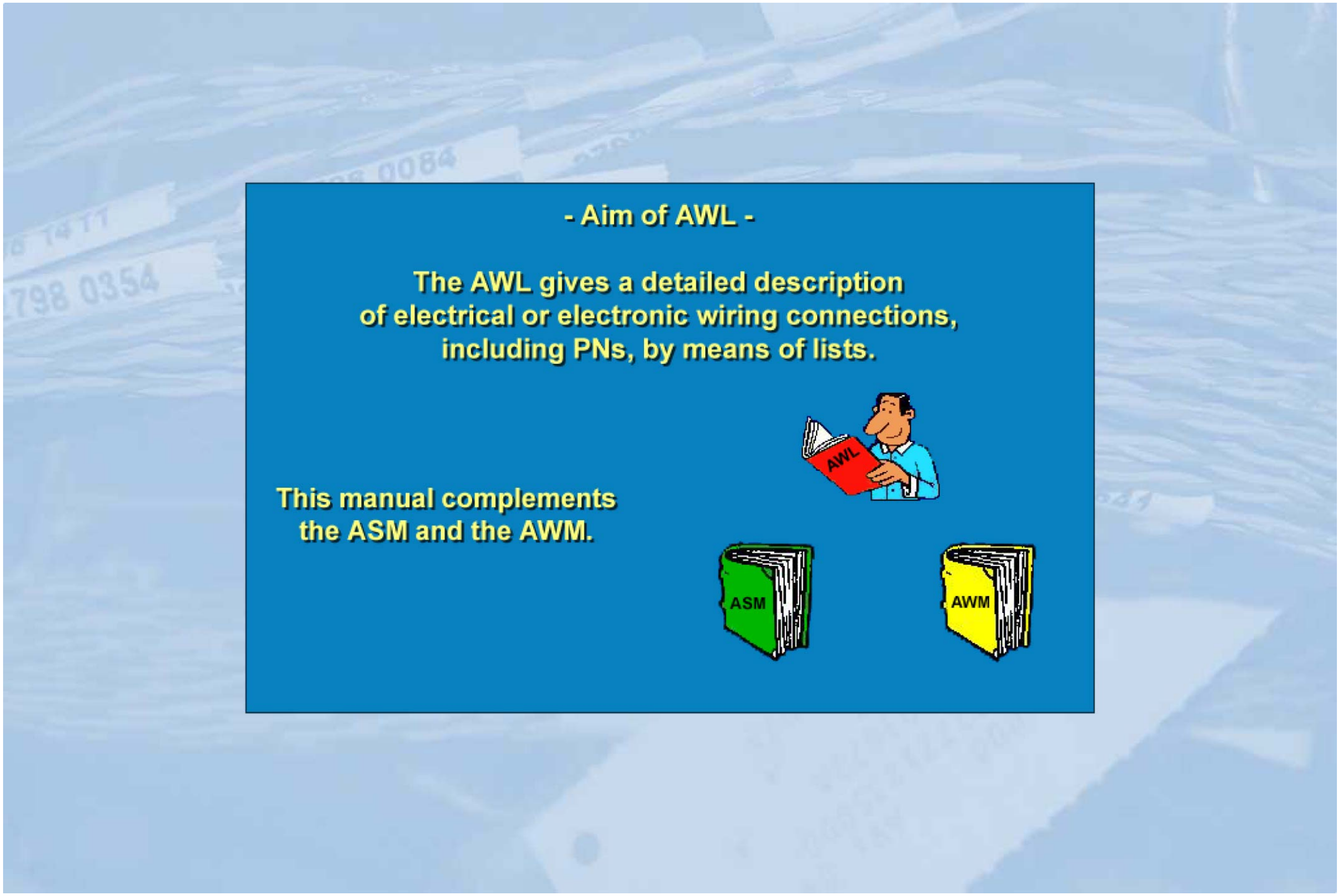

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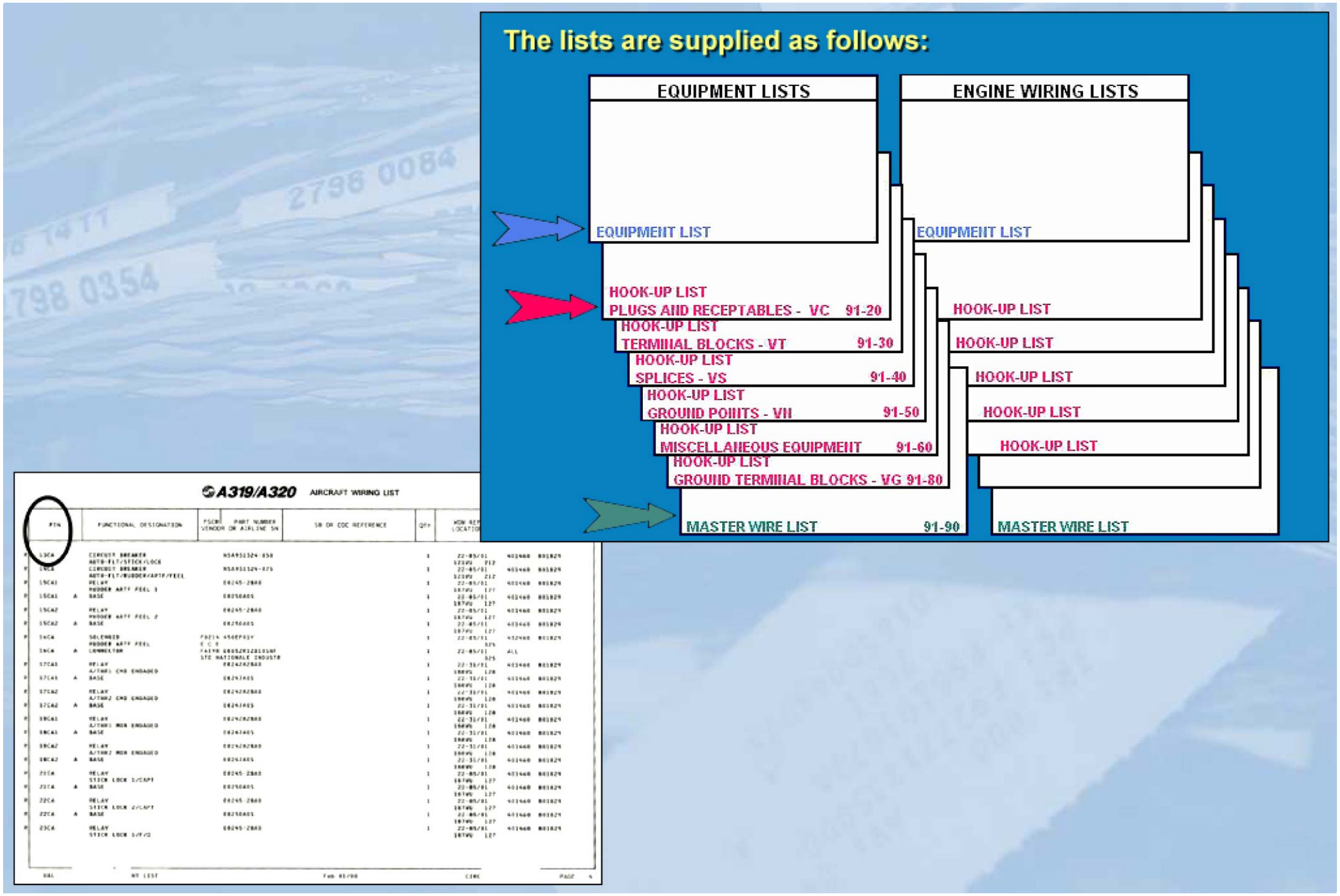

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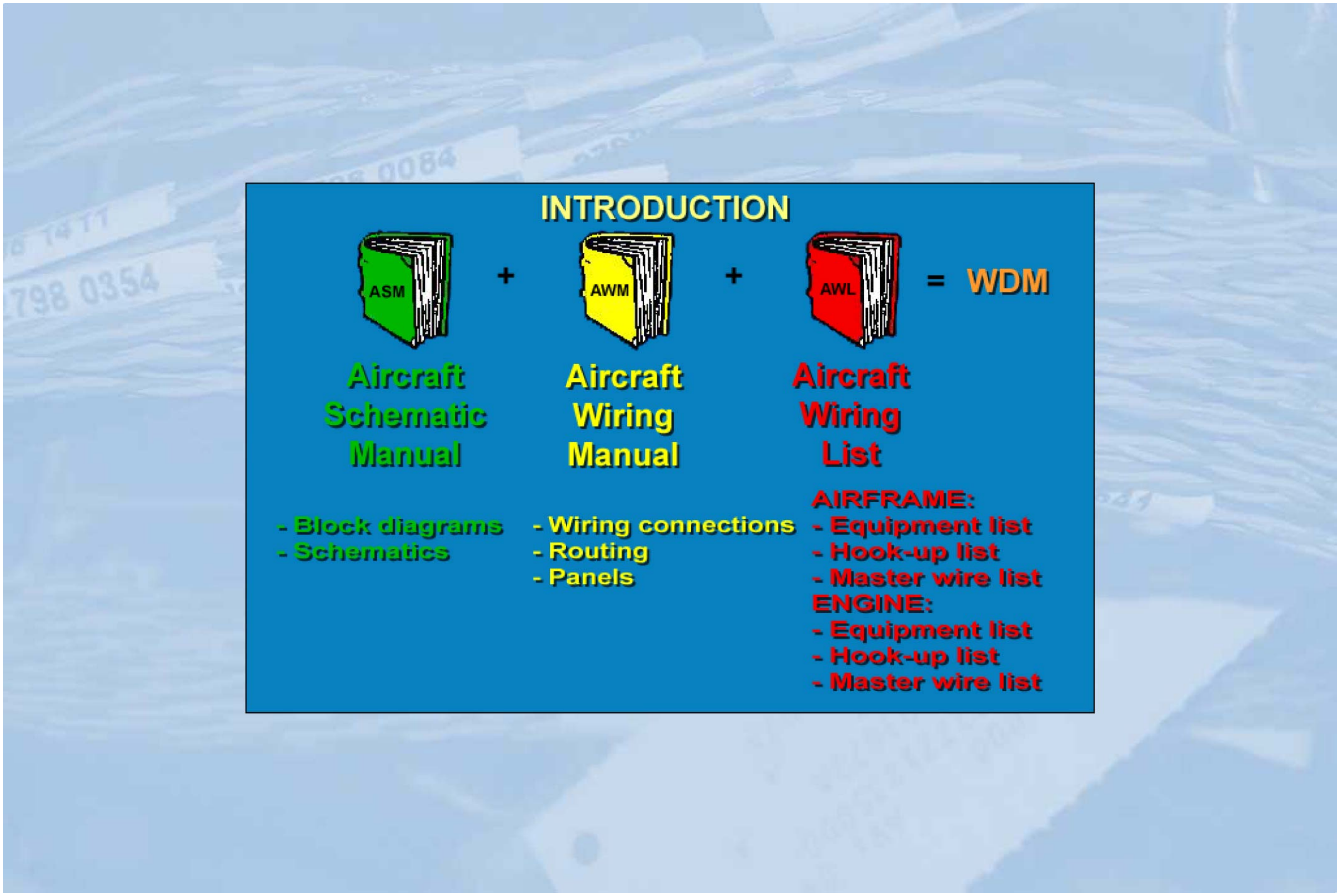

INTRODUCTION

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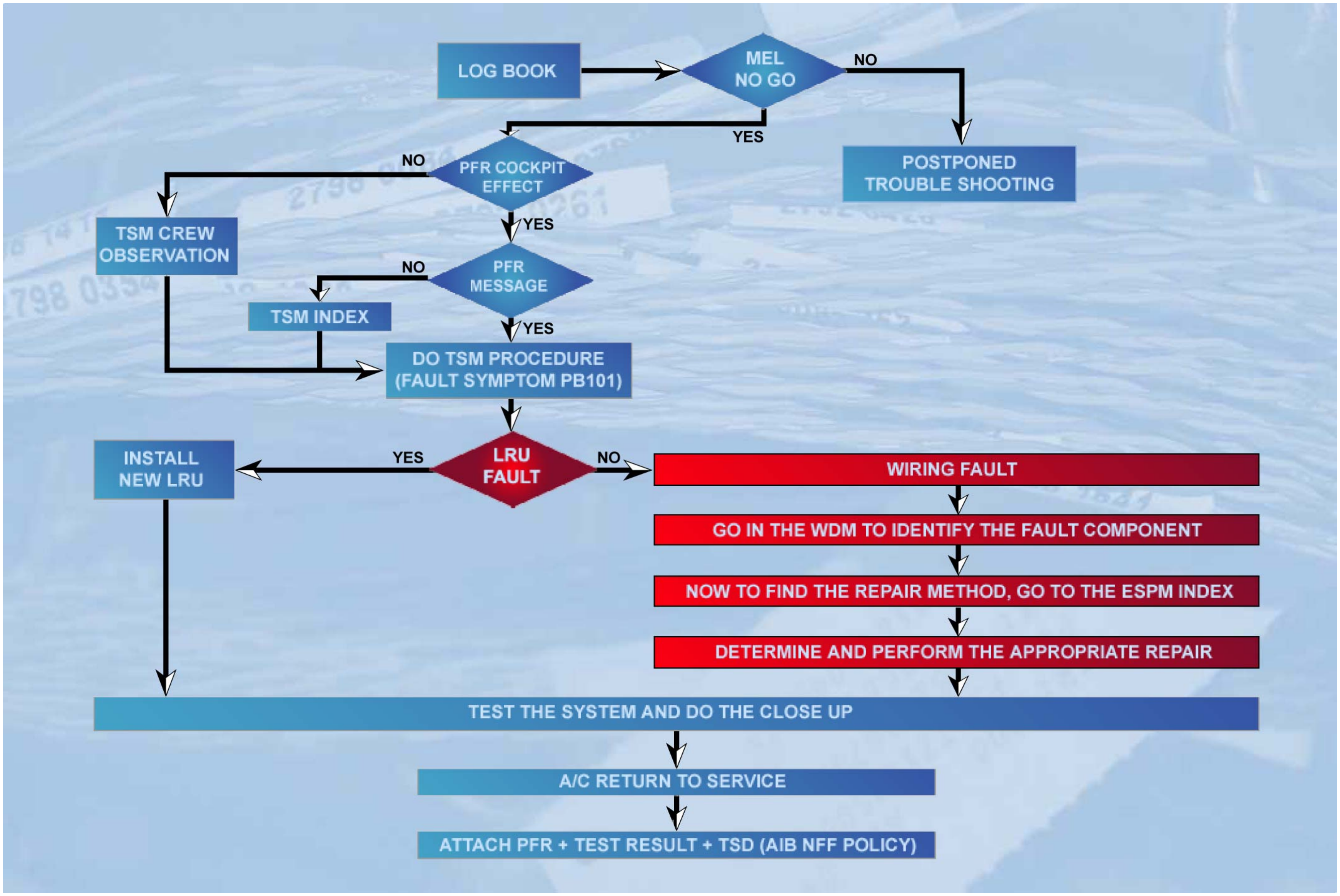
WIRING DIAGRAM MANUAL (WDM)

TYPICAL EXAMPLE OF UTILIZATION

Let's see at which stage those documents are used.
Let's suppose the aircraft is in transit and you have a log book complaint
Now, you must check the MEL to see if it is a go or no go fault.
If there is "NO GO" you can postpone the trouble shooting.
But if there is a "NO GO" you have to check the PFR.
If there is no PFR cockpit effect, you must go in the TSM observation index and follow the TSM procedure.
If you have a Post Flight Report message, you also go to the relevant index and do the TSM procedure.
During the TSM procedure, you have to verify if it is a LRU fault.
If you confirm it is a LRU fault, you consequently have to install a new one.
And to do the test and the close up of the task. Then, the aircraft is ready to return to service.
Now, in the case it is not a LRU fault, it is a wiring fault (a connector, a wire, etc...)
You have to check the relevant WDM (ASM, AWM, AWL) to identify the exact component which causes the fault.
When the component is identified, you must refer to the indexes of the ESPM.
In order to find the repair process and to do it.
When the repair is completely done, you have to test the system, to do the close up and the aircraft is ready to return to service.

TYPICAL EXAMPLE OF UTILIZATION

TYPICAL EXAMPLE OF UTILIZATION



TYPICAL EXAMPLE OF UTILIZATION

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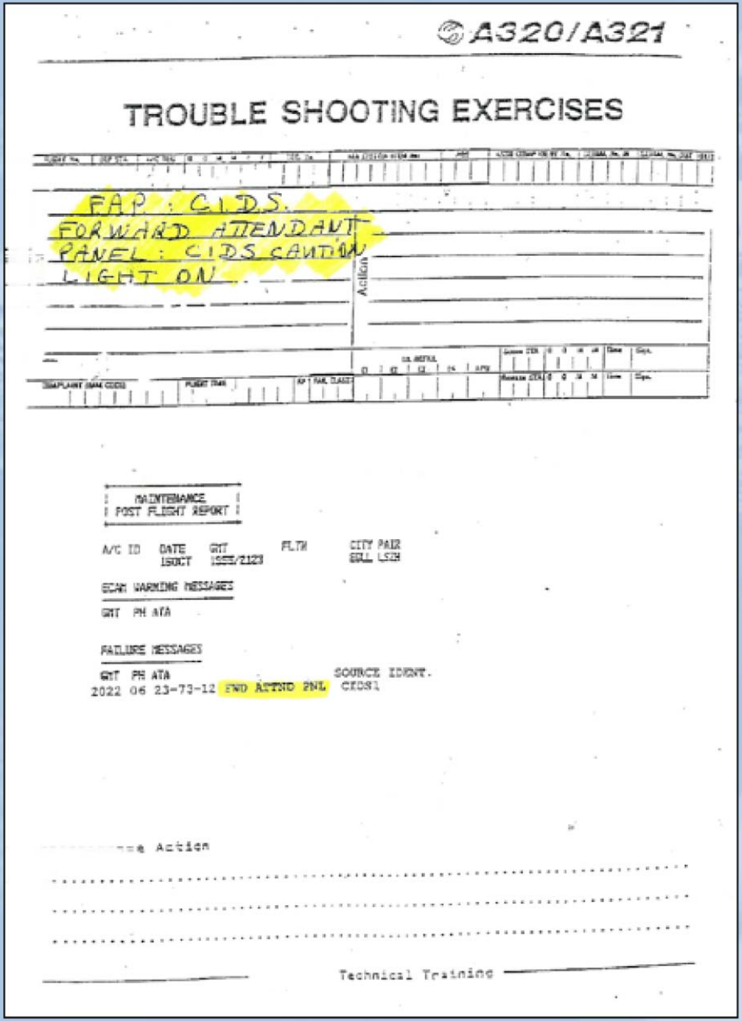
WIRING DIAGRAM MANUAL (WDM)

TYPICAL EXAMPLE OF UTILIZATION (continued)

Practical exercise

You have the following messages:
- on the log book: FAP CIDS Forward Attendant Panel CIDS caution light on.
- on the PFR: FWD ATTND PNL.

And we know it is a "NO GO" message.
You have to find the relevant message in the TSM and make correlation in the fault symptoms to find the fault isolation procedure.
Now with the procedure of the TSM, you have to follow the procedure step by step. Here we suppose the LRUs are ok. Consequently, it is the wiring.
Now by checking the wiring with the help of the WDM, we find there is an open circuit between 120RH A 17 and ground. The contact of the pin D (terminal block 2749VT10) is damaged.
To change the contact, you have to refer to the hook-up list to find the Part Number (PN) of this contact.
With this PN, go into the ESPM to find all the information concerning this contact.
Finally, in the relevant section of the ESPM, you find all the information concerning the stripping length and tool.
The insertion/extraction tool for this contact.
And the crimping tool.
Now, you have to perform the test to check the system. You have to visually check the area to ensure it is free of tool, debris, etc... and the aircraft will be ready to return in service.


A320/A321

TROUBLE SHOOTING EXERCISES

FAP : C.I.D.S.
FORWARD ATTENDANT PANEL : CIDS CAUTION LIGHT ON

MAINTENANCE POST FLIGHT REPORT

A/C ID DATE GMT FLTN CITY PAIR

ECAM WARNING MESSAGES

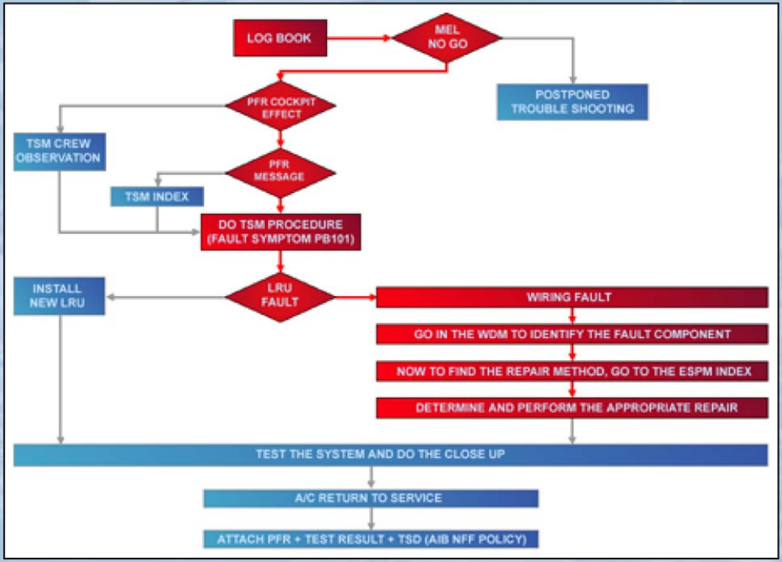
GMT PH ATA

FAILURE MESSAGES

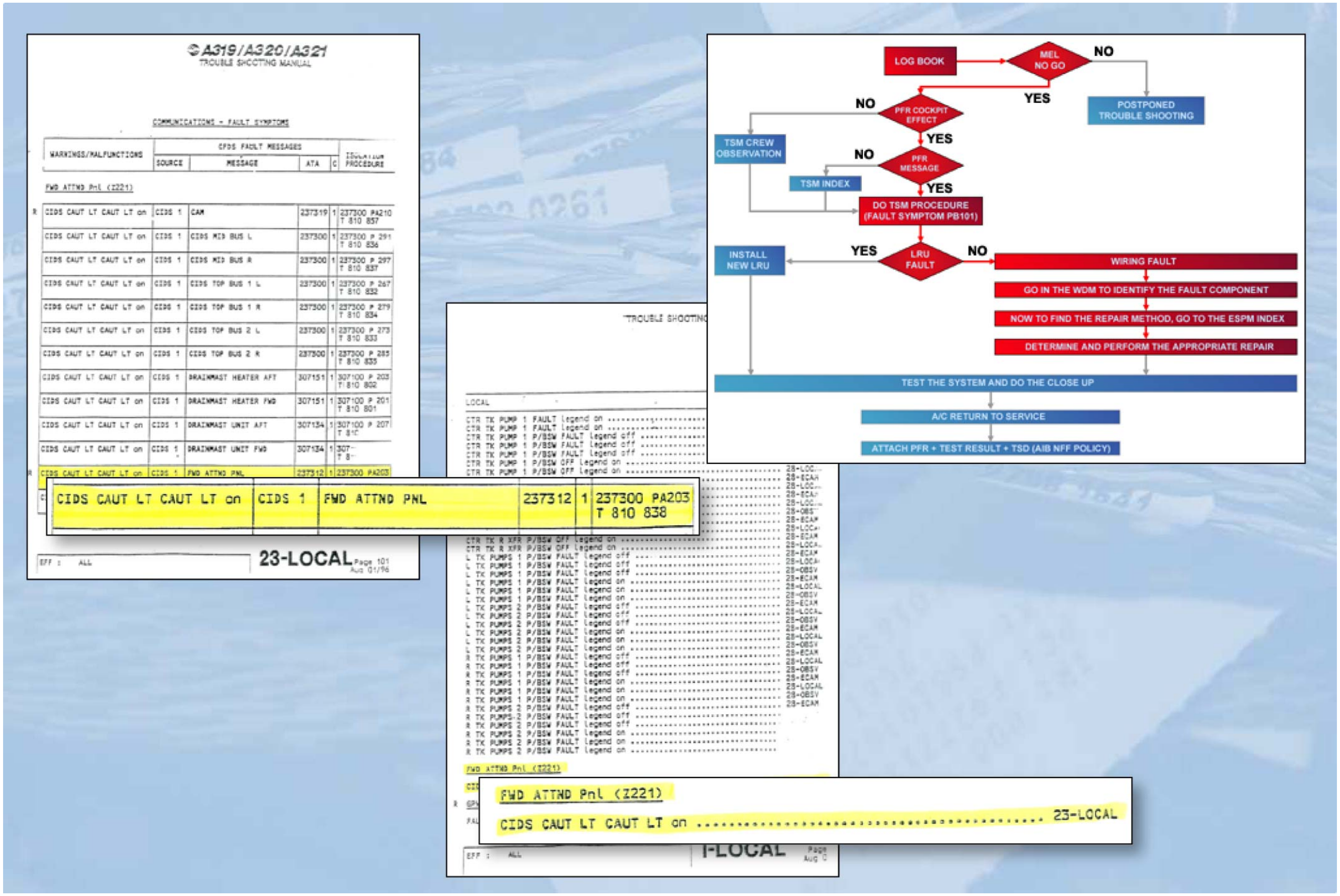
GMT PH ATA SOURCE IDENT.
2022 06 23-73-12 FWD ATTND PNL CIDS1

Action

Technical Training

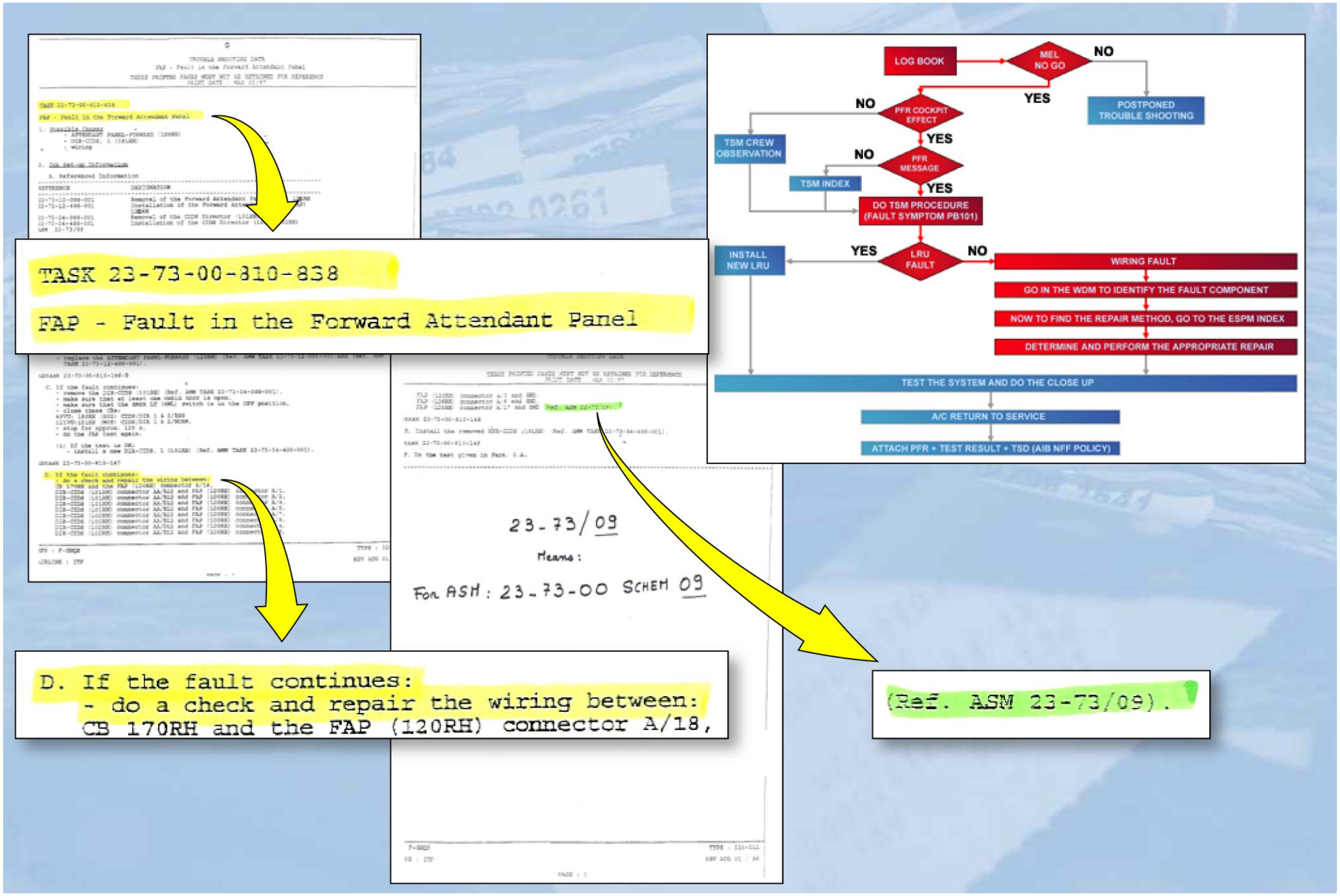


TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE



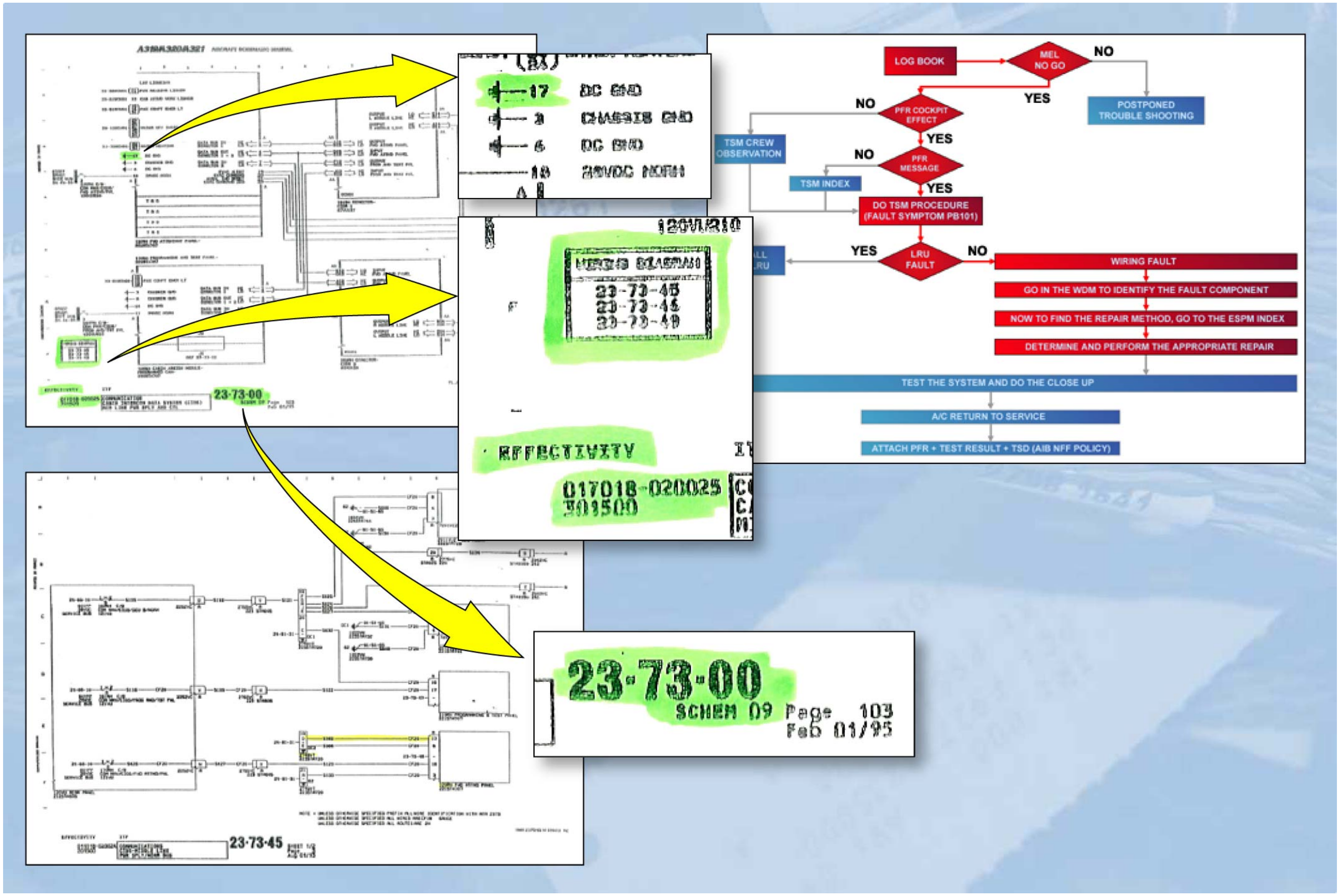
TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE

X8U08481 - X0332T0 - XM2011000000001



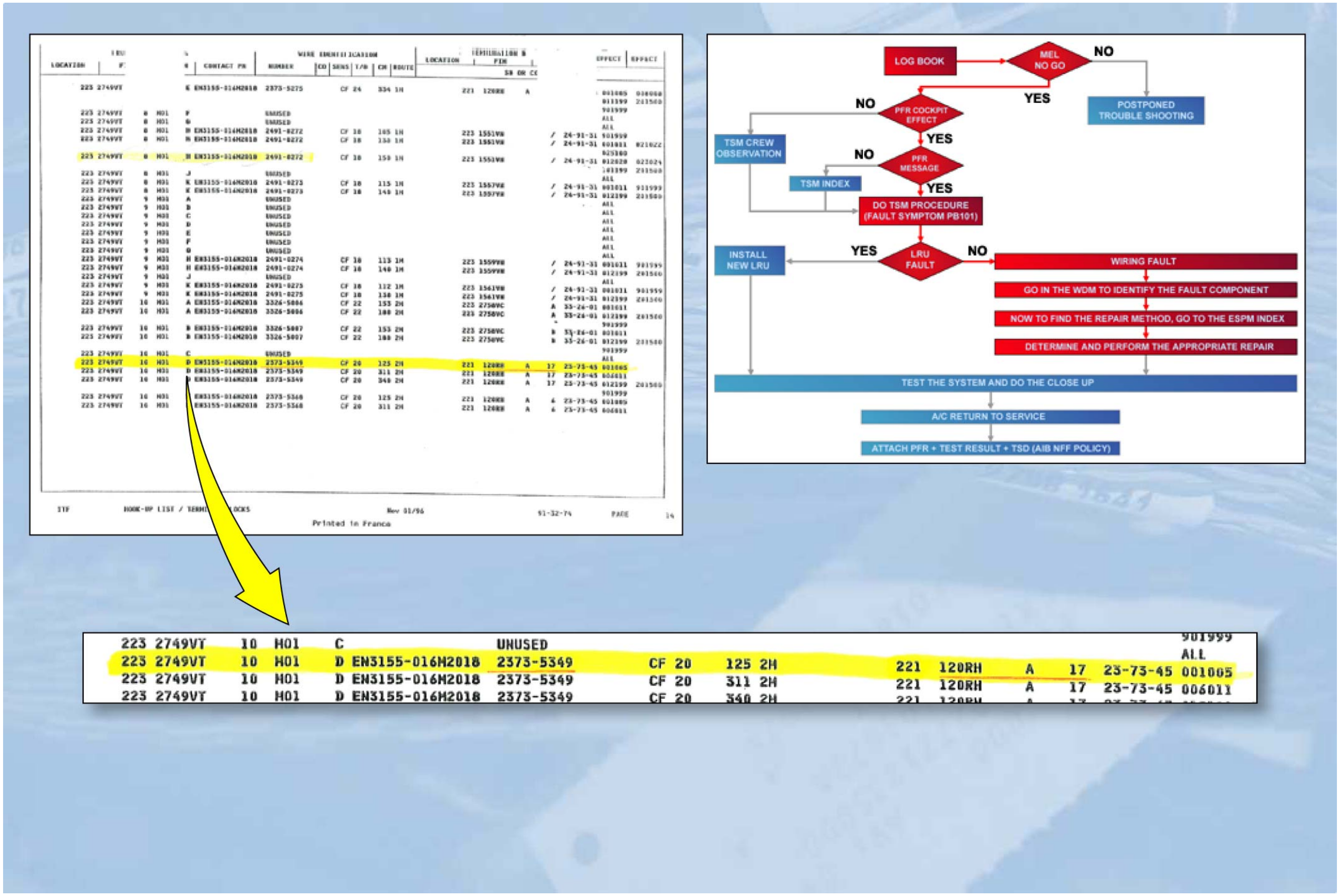
TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE

X8U08481 - X0332T0 - XM2011000000001



TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE

X8U08481 - X0332T0 - XM2011000000001



TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

EN	ASN OR NSA	TOPIC NUMBER
	NSA938403PX2006	20-48-21
EN3155-015F2018	E0396DV2001	20-48-24
	NSA938403SX2005	OR
	NSA938403SX2006	20-48-21
EN3155-016M2222	NSA937910EA2200	20-48-24
EN3155-016M2018	NSA937910EA2000	OR
EN3155-016M1616	NSA937910EA1600	20-48-25
EN3155-016M1212	NSA937910EA1200	
EN3155-017F1616	E0252DK1600	20-48-24
EN3155-017F1620	E0252DK1601	OR
EN3155-017F1212	E0252DK1200	20-48-25
EN3155-017F1216	E0252DK1201	
EN3155-018M2018	NSA938151PA2000	
EN3155-018M1616	NSA938151PA1600	20-48-24
EN3155-018M1614	NSA938151PA1601	OR
EN3155-018M1618	NSA938151PA1602	20-48-21
EN3155-018M1212	NSA938151PA1200	
EN3155-019F2018	NSA938152SA2000	
EN3155-019F1616	NSA938152SA1600	20-48-24
EN3155-019F1614	NSA938152SA1601	OR
EN3155-019F1618	NSA938152SA1602	20-48-21
EN3155-019F1212	NSA938152SA1200	
EN3155-019F1218	NSA938152SA1202	

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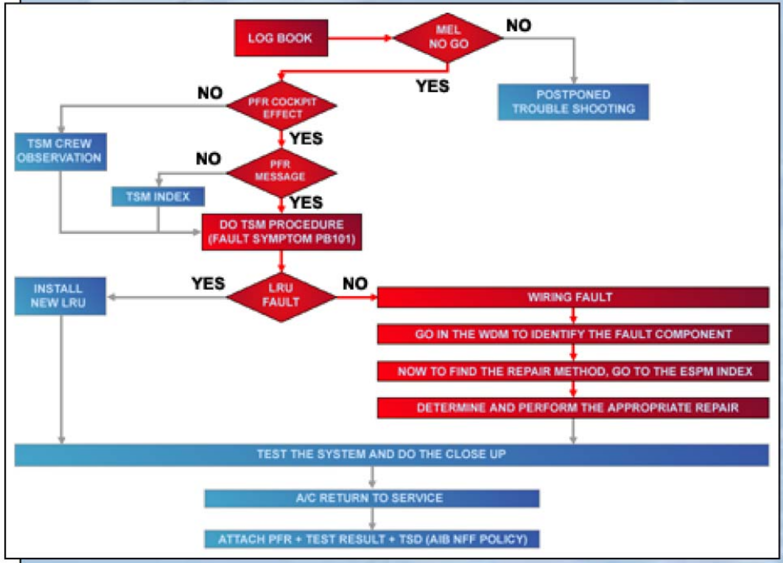
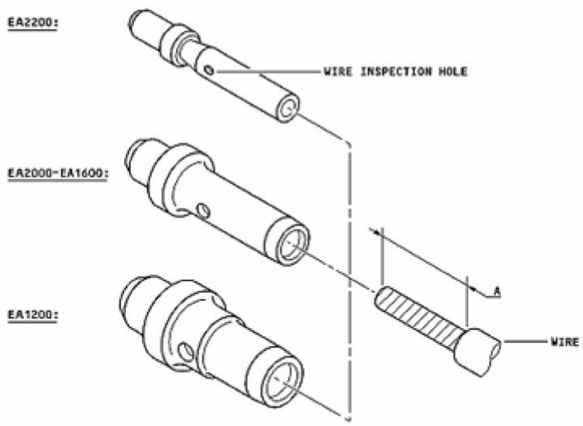


TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL



NSA937910 E A 22 00
- 00 — NO PARTICULAR SPECIFICATION
- 22 — CONTACT SIZE
- A — TYPE CODE
- E — WIRE END
- NSA937910 — STANDARD P/N

NSA937910EAXXXX

CONTACT	ADMISSIBLE WIRE GAUGE	STRIPPING			
		LENGTH "A"	TOOL		
			NORM	P/N	COLOR
EA2200	26 TO 22	4	STRIPMASTER	45-2020-1	BLUE
EA2000	2 X 24	4.8			
	24 TO 18	4.5			
EA1600	20 TO 16	7			
EA1200	14 AND 12			45-1939-1	RED

S15 20 48 25 0 BCMO 05

Miscellaneous Contacts - P/N Characteristics and Tools
NSA937910
Figure 016

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AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

P/N:NSA937910EAXXXX

CONTACT	ADMISSIBLE WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
EA2200	26		22520/2-01	DANIELS	K127-2 OR K673 OR 613670	-	2
	24						2
	22			ASTRO			3
	26		22520/7-01	DANIELS	86-88		2
	24						3
	22						4
EA2000	2 X 24	MIL	22520/1-01	MIL	22520/1-02	RED	3
			22520/2-01		22520/2-02	BLUE	6
			22520/7-01		22520/7-02	GREEN	5
	24		22520/1-01		22520/1-02	RED	2
			22520/2-01		22520/2-02	BLUE	5
			22520/7-01		22520/7-02	GREEN	4
	22		22520/1-01		22520/1-02	RED	3
			22520/2-01		22520/2-02	BLUE	6
			22520/7-01		22520/7-02	GREEN	5
	20		22520/1-01		22520/1-02	RED	4
			22520/2-01		22520/2-02	BLUE	7
			22520/7-01		22520/7-02	GREEN	6
	18		22520/1-01		22520/1-02	RED	5
			22520/2-01		22520/2-02	BLUE	8
			22520/7-01		22520/7-02	GREEN	7
EA1600	20		22520/1-01		22520/1-02	BLUE	4
			22520/7-01		22520/7-03	GREEN	5
	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	GREEN	6
	16		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	GREEN	7
EA1200	14		22520/1-01		22520/1-02	YELLOW	7
	12						8

P/N:NSA937910EAXXXX

CONTACT	ELEMENT LEG DIAMETER	HAND CRIMPING TOOL					
		TOOL		LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
EA2000	0.5	MIL	22520/2-01	MIL	22520/2-02	BLUE	5
			22520/7-01		22520/7-02	GREEN	6
	0.6		22520/2-01		22520/2-02	BLUE	5
			22520/7-01		22520/7-02	GREEN	6
	0.8		22520/2-01		22520/2-02	BLUE	6
			22520/7-01		22520/7-02	GREEN	7

S15 20 48 25 0 BGMO 03

Miscellaneous Contacts - Crimping Tools
NSA937910
Figure 018

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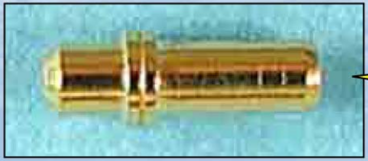
TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE

X8U08481 - X0332T0 - XM2011000000001

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL



PIN:NSA937910EAXXXX

CONTACT		INSERTION/EXTRACTION TOOLS			
PIN	CHARACTERISTICS	UTILIZATION	NORM	P/N	COLOR
EA2200	WIRED	INS/EXT	MIL	81969/14-01	GREEN/WHITE
		INS	DANIELS	DAK 9522M	-
		EXT		DRK 9522M	-
		INS	ASTRO	ATBX 1054	-
		EXT		ATBX 2050	-
EA2000	WIRED	INS/EXT	MIL	81969/14-11	RED/WHITE
		INS	ASTRO	ATR 1080S	-
		EXT		ATR 2080S	WHITE
	UNWIRED	EXT	MIL	81969/30-05	RED/SILVER
		EXT	SOURIAU	8522-56	RED
		EXT	CANNON	CET 20-24	RED
		EXT	DEUTSCH	M15571 +105910	RED
EA1600	WIRED	INS/EXT	MIL	81969/14-03	BLUE/WHITE
	UNWIRED	EXT	MIL	81969/30-06	BLUE/SILVER
		EXT	SOURIAU	8522-57	BLUE
		EXT	CANNON	CET 16-21	BLUE
		EXT	DEUTSCH	M15571 +105911	BLUE
EA1200	WIRED	INS/EXT	MIL	81969/14-04	YELLOW/WHITE
	UNWIRED	EXT	MIL	81969/30-07	YELLOW/SILVER
		EXT	SOURIAU	8522-58	YELLOW
		EXT	CANNON	CET 12-16	YELLOW
		EXT	DEUTSCH	M15571 +105912	YELLOW

S15 20 48 25 0 BEMO 02

Miscellaneous Contacts - Insertion/Extraction Tools
NSA937910
Figure 017

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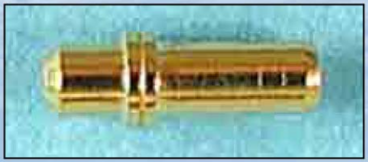
TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

P/N:NSA937910EAXXXX

CONTACT	ADMISSIBLE WIRE GAUGE	HAND CRIMPING TOOL – TOOL – NORM	TOOL – P/N	TURRET/LOCATOR – NORM	TURRET/LOCATOR – P/N	TURRET/LOCATOR – COLOR	SELECTOR POSITION
EA2200	26	MIL	22520/2-01	DANIELS	K127-2 OR K673 OR 613670	-	2
	24						2
	22			ASTRO			3
	26		22520/7-01	DANIELS	86-88		2
	24						3
	22						4
EA2000	2 X 24		22520/1-01	MIL	22520/1-02	RED	3
			22520/2-01		22520/2-02	BLUE	6
			22520/7-01		22520/7-02	GREEN	5
	24		22520/1-01		22520/1-02	RED	2
			22520/2-01		22520/2-02	BLUE	5
			22520/7-01		22520/7-02	GREEN	4
	22		22520/1-01		22520/1-02	RED	3
			22520/2-01		22520/2-02	BLUE	6
			22520/7-01		22520/7-02	GREEN	5
	20		22520/1-01		22520/1-02	RED	4
			22520/2-01		22520/2-02	BLUE	7
			22520/7-01		22520/7-02	GREEN	6
	18		22520/1-01		22520/1-02	RED	5
			22520/2-01		22520/2-02	BLUE	8
			22520/7-01		22520/7-02	GREEN	7
EA1600	20		22520/1-01		22520/1-02	BLUE	4
			22520/7-01		22520/7-03	GREEN	5
	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	GREEN	6
	16		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	GREEN	7
EA1200	14		22520/1-01		22520/1-02	YELLOW	7
	12						8

P/N:NSA937910EAXXXX

CONTACT	ELEMENT LEG DIAMETER	HAND CRIMPING TOOL – TOOL – NORM	TOOL – P/N	LOCATOR – NORM	LOCATOR – P/N	LOCATOR – COLOR	SELECTOR POSITION
EA2000	0.5	MIL	22520/2-01	MIL	22520/2-02	BLUE	5
			22520/7-01		22520/7-02	GREEN	6
	0.6		22520/2-01		22520/2-02	BLUE	5
			22520/7-01		22520/7-02	GREEN	6
	0.8		22520/2-01		22520/2-02	BLUE	6
			22520/7-01		22520/7-02	GREEN	7

S15 20 48 25 0 BGMO 03

Miscellaneous Contacts - Crimping Tools
NSA937910
Figure 018

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TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE

X8U08481 - X0332T0 - XM2011000000001

TYPICAL EXAMPLE OF UTILIZATION - PRACTICAL EXERCISE

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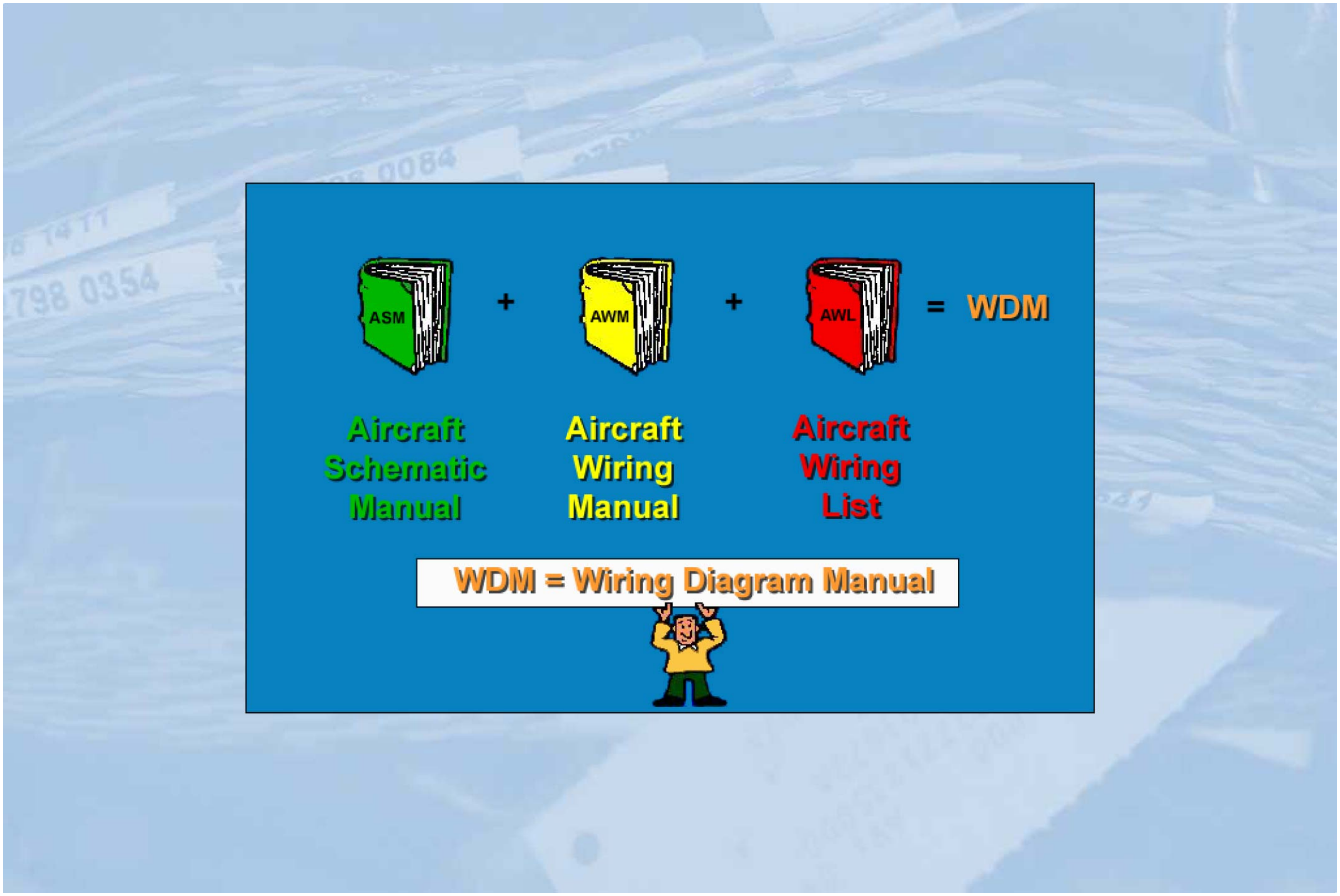
WIRING DIAGRAM MANUAL (WDM)

WDM DETAILS

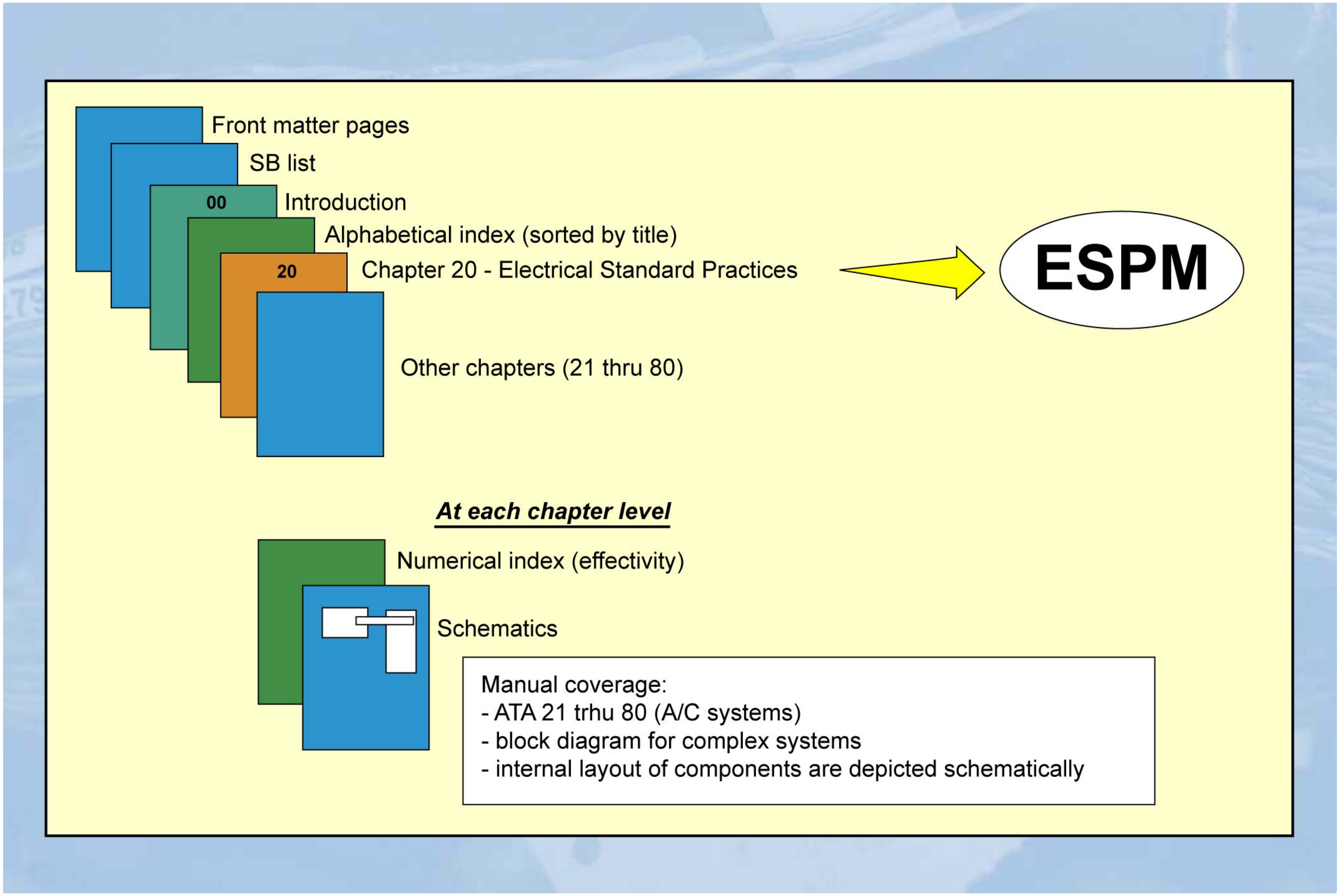
WDM DETAILS

ASM

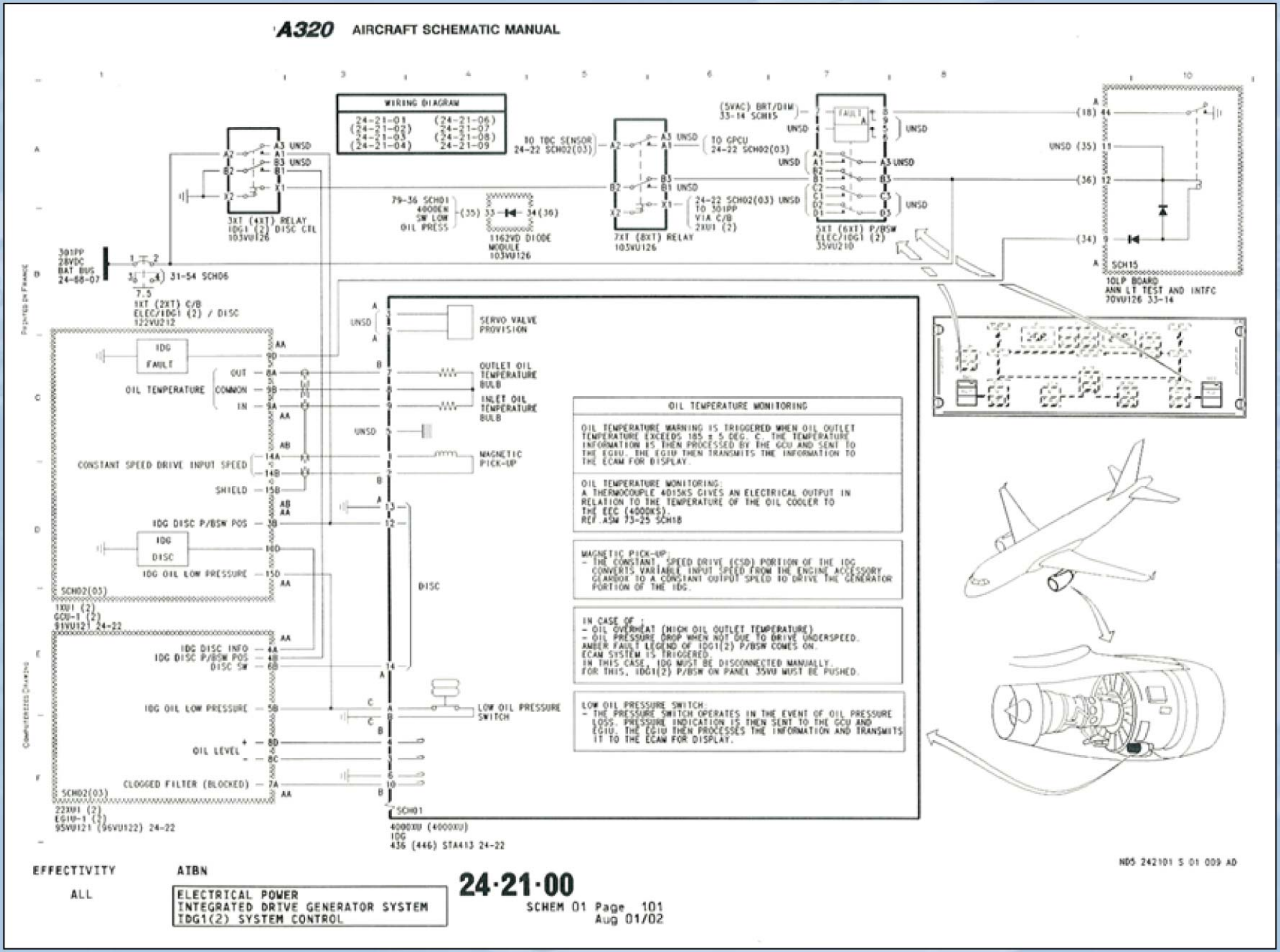
The Aircraft Schematic Manual (ASM) contains diagrams intended for troubleshooting aircraft systems. It also facilitates the understanding of the systems and can be used for staff training maintenance.
The manual is divided as follow.
Front matter pages, service bulletin list, introduction, alphabetical index (sorted by title), chapter 20 (electrical standard practices which are now referred to the ESPM) and the other chapters (21 thru 80).
Example of schematic.



WDM DETAILS - ASM



WDM DETAILS - ASM



WDM DETAILS - ASM

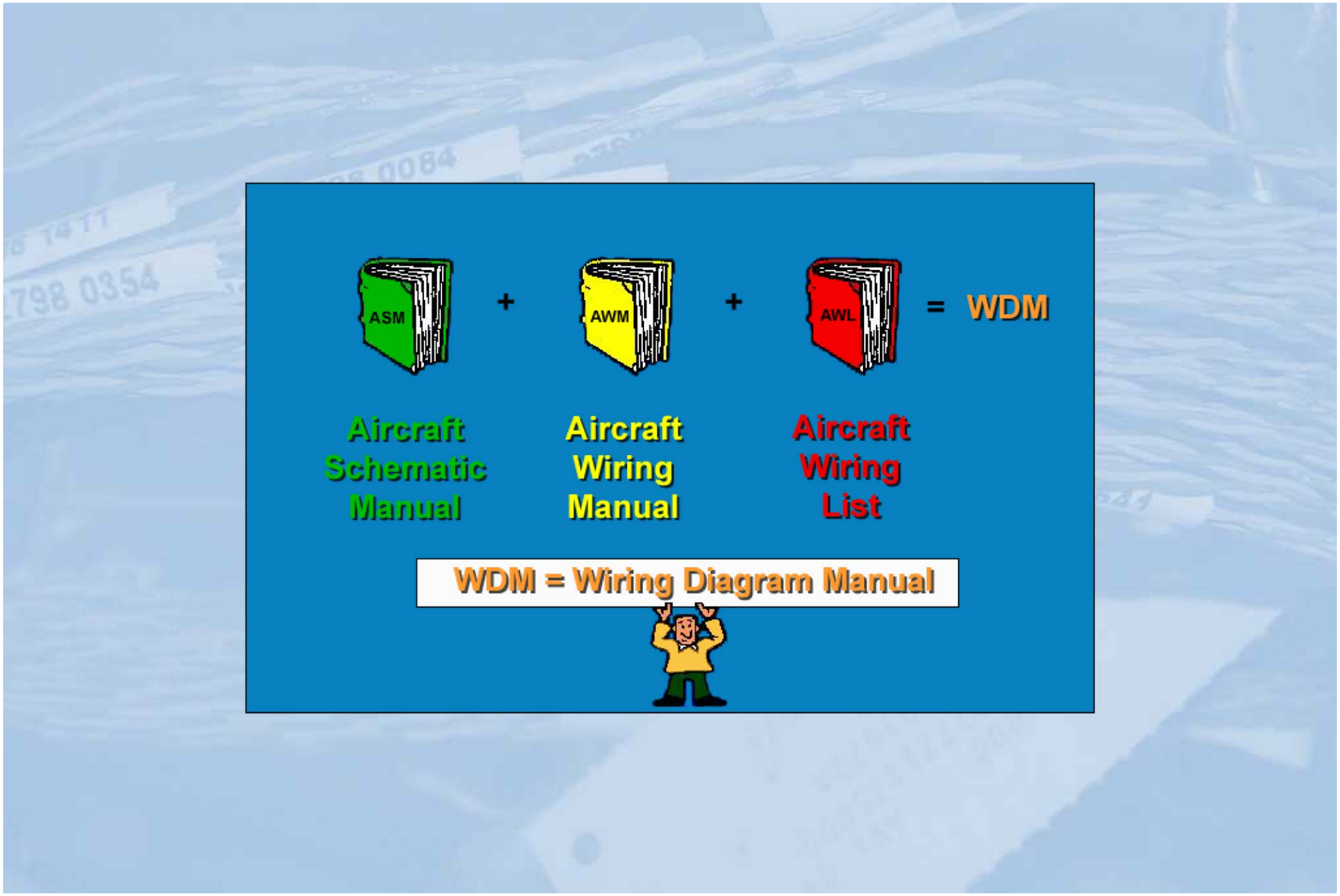
WIRING DIAGRAM MANUAL (WDM)

WDM DETAILS (continued)

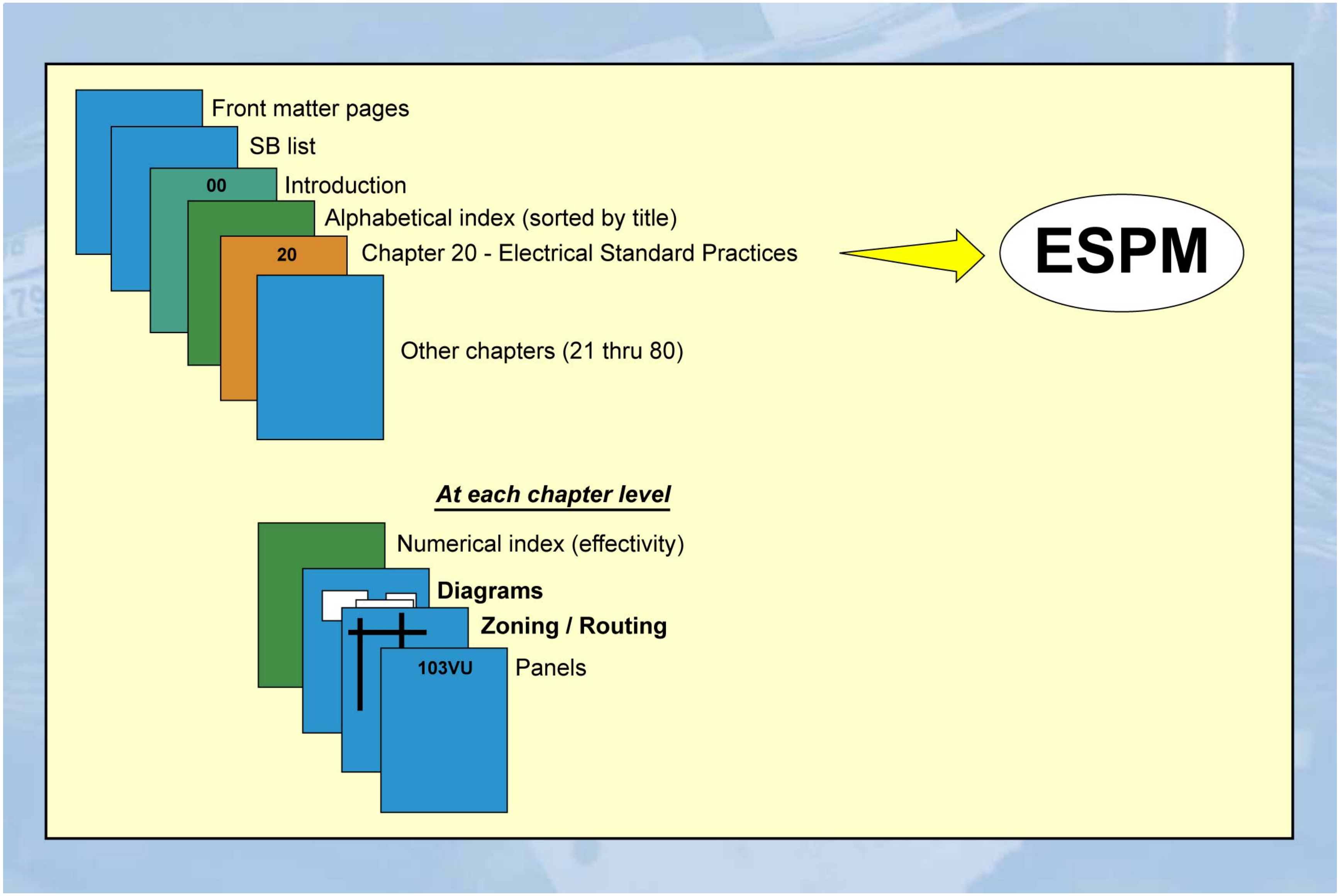
AWM

The Aircraft Wiring Manual (AWM) details all the aircraft wiring connections. The diagrams are intended for trouble shooting the aircraft wiring.
The manual is divided as follow.
Front matter pages, service bulletin list, introduction, alphabetical index (sorted by title), chapter 20 (electrical standard practices which are now referred to the ESPM) and the other chapters (21 thru 80).
This page is an example of wiring diagram.

X8U08481 - X0332T0 - XM2011000000001



WDM DETAILS - AWM



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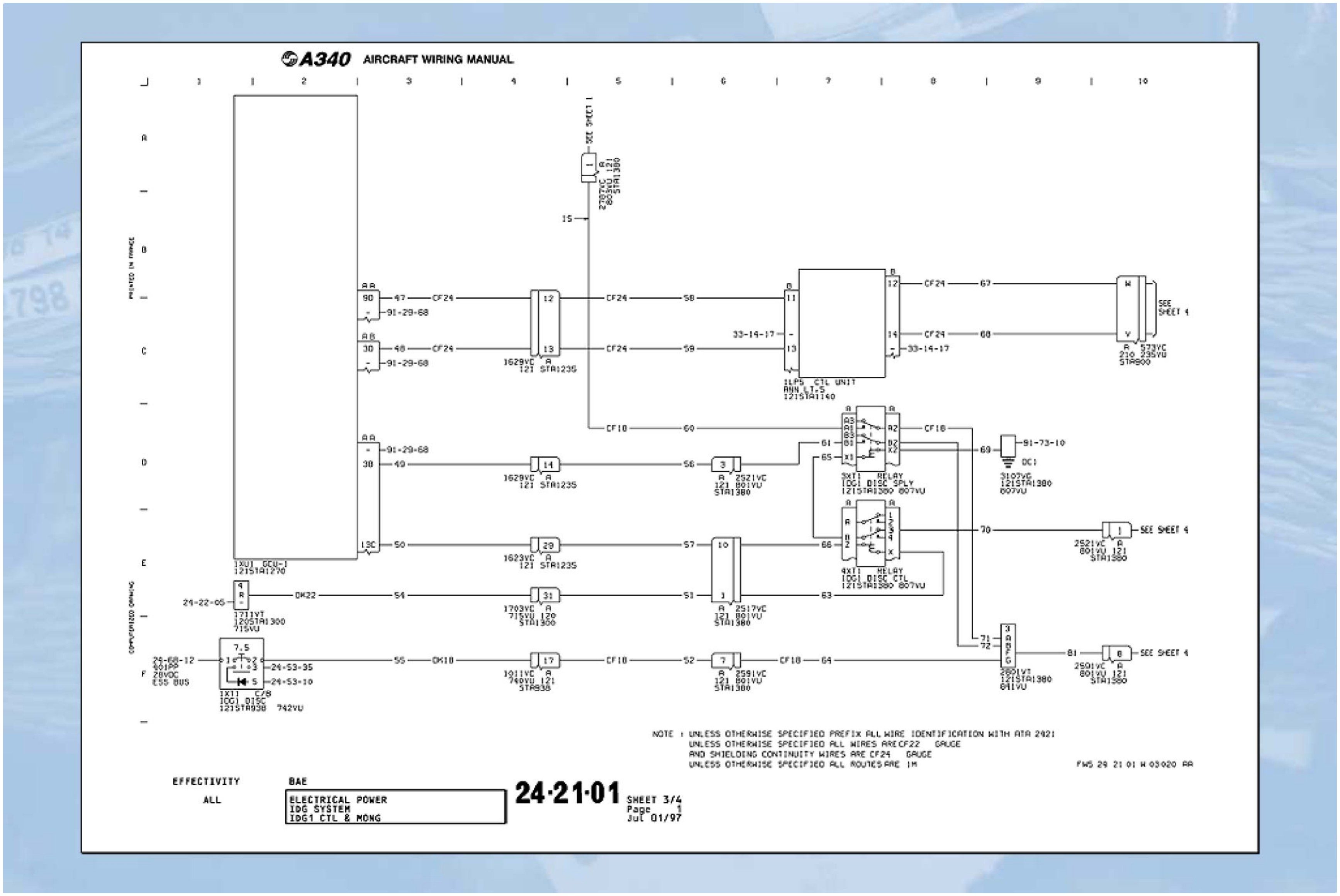


WDM DETAILS - AWM

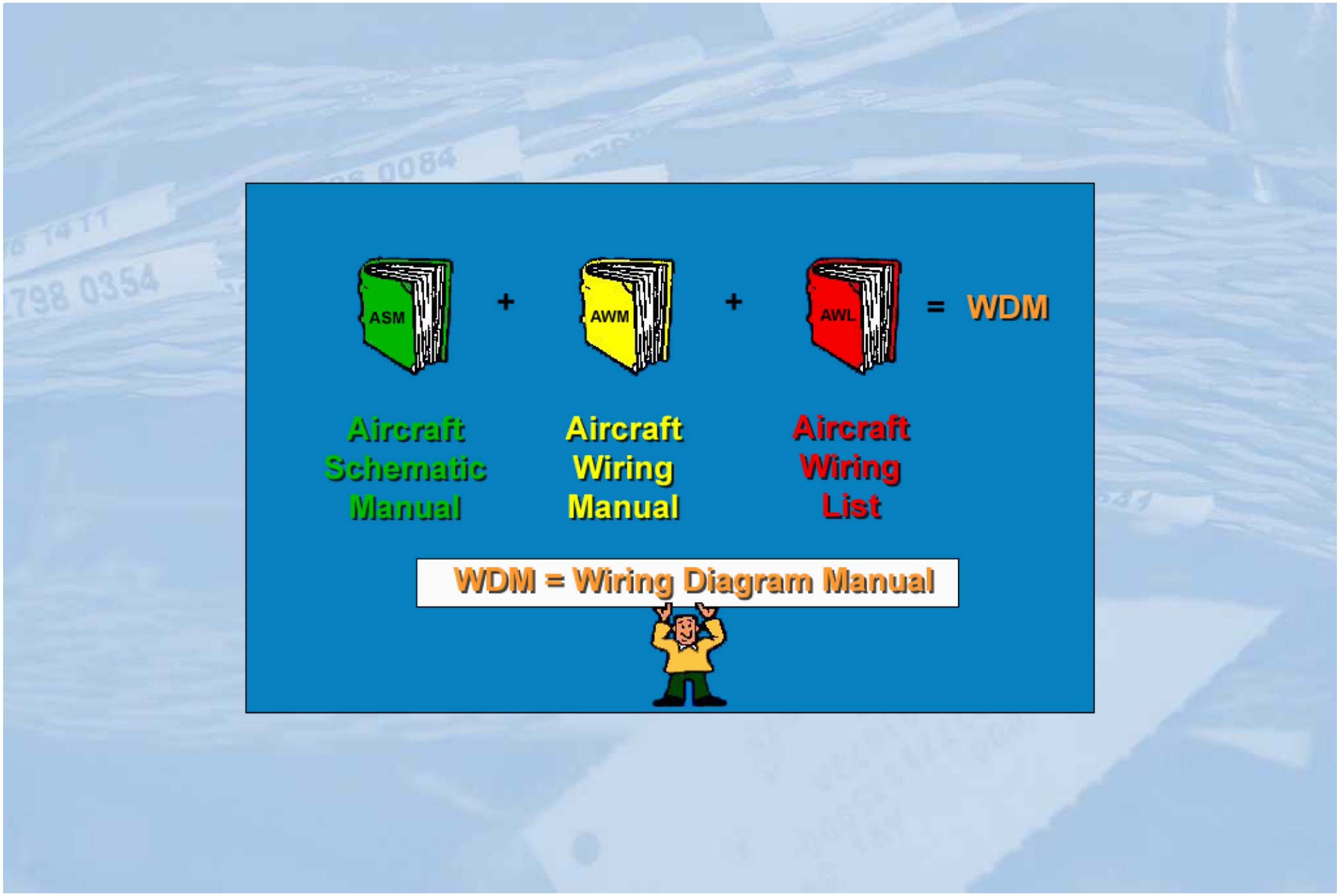
X8U08481 - X0332T0 - XM20110000000001

WIRING DIAGRAM MANUAL (WDM)

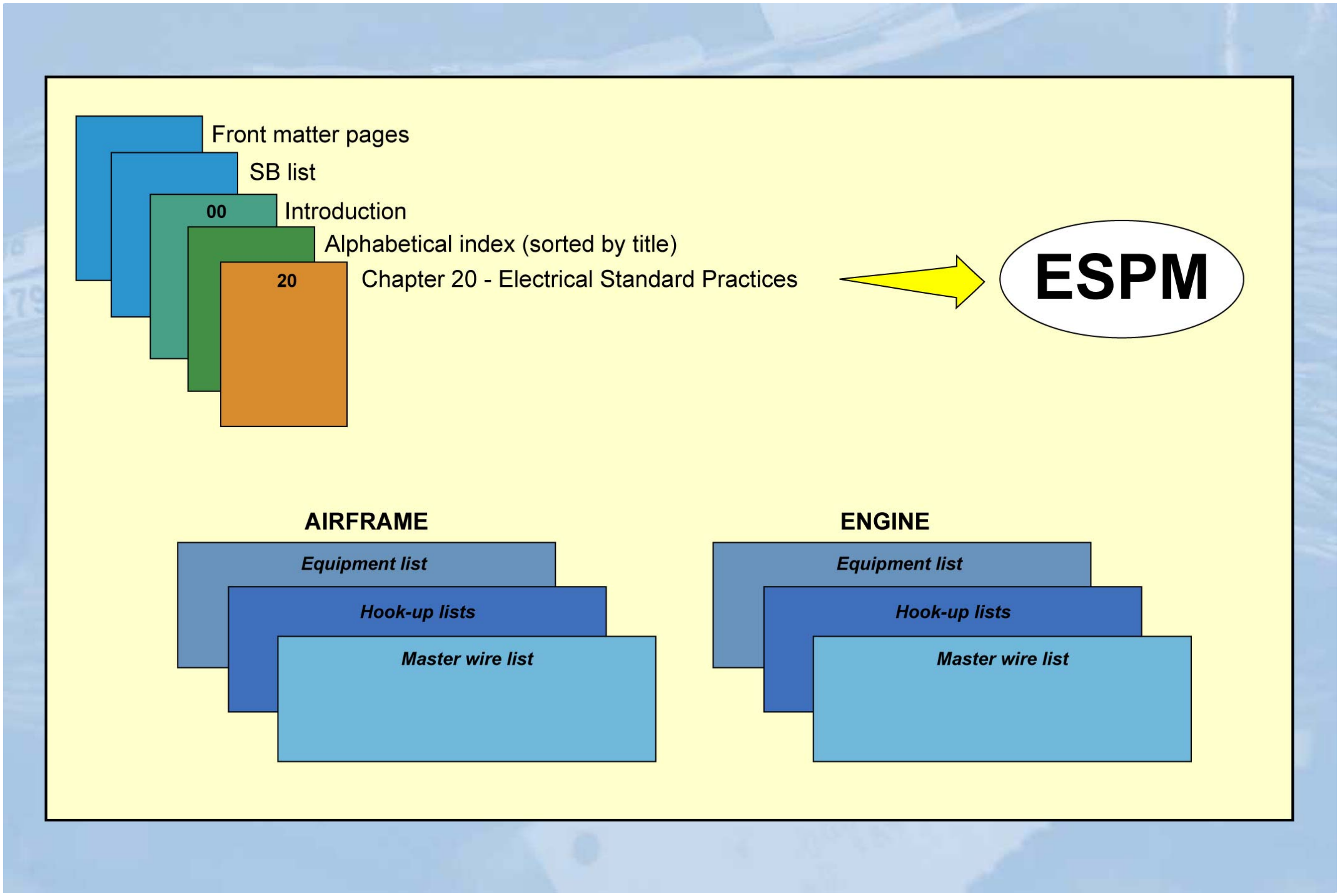
WDM DETAILS (continued)

AWL

The Aircraft Wiring List (AWL) gives a detailed description of electrical or electronic wiring connections by means of lists.
This manual is divided as follow:
Front matter pages, SB list, introduction, alphabetical index (sorted by title), chapter 20 (electrical standard practices which are now refered to the ESPM) and the various lists.
Example of wiring list.



WDM DETAILS - AWL



WDM DETAILS - AWL

A320 AIRCRAFT WIRING LIST

WIRE IDENTIFICATION NUMBER	CO	SENS	T/G	CM	ROUTE	FROM TERMINATION A FIN	CON	LOCATION	TO TERMINATION B FIN	CON	LOCATION	WDM REF	EFFECT	EFFECT	EFFECT
FEED TRHU / CT FIN	CON		LOCATION			FEED TRHU / CT FIN	CON	LOCATION	FEED TRHU / CT FIN	CON	LOCATION	SB OR COC REFERENCE			
2421-7002 R			TT 22	781	1S	415VC	9	521	1907VC A	9		24-21-01	402499		
4005VP															
2421-7002 R			TT 22	781	1S	415VC	9	521	1907VC A	9	131	24-21-01	401401		
4005VP					137										
2421-7003 B			UE 22	781	2S	414VC	7	621	1900VC A	3		24-21-02	402499		
4008VP															
2421-7003 B			UE 22	781	2S	414VC	7	621	1900VC A	3	132	24-21-02	401401		
4008VP					138										
2421-7003 R			UE 22	765	2S	414VC	8	621	1900VC A	2		24-21-02	402499		
4008VP															
2421-7003 R			UE 22	765	2S	414VC	8	621	1900VC A	2	132	24-21-02	401401		
4008VP					138										
2421-7003 Y			UE 22	765	2S	414VC	5	621	1900VC A	4		24-21-02	402499		
4008VP															
2421-7003 Y			UE 22	765	2S	414VC	5	621	1900VC A	4	132	24-21-02	401401		
4008VP					138										
2421-7005 B			TT 22	765	2S	414VC	6	621	1900VC A	10		24-21-02	402499		
4008VP															
2421-7005 B			TT 22	765	2S	414VC	6	621	1900VC A	10	132	24-21-02	401401		
4008VP					138										
2421-7005 R			TT 22	765	2S	414VC	10	621	1900VC A	9		24-21-02	402499		
4008VP															
2421-7005 R			TT 22	765	2S	414VC	10	621	1900VC A	9	132	24-21-02	401401		
4008VP					138										
2421-7050 B			UD 22	1464	2S	1XU2 AA	9A	91VU 121	1900VC	4	132	24-21-02	ALL		
2421-7050 R			UD 22	1464	2S	1XU2 AA	8A	91VU 121	1900VC	2	132	24-21-02	ALL		
2421-7050 Y			UD 22	1464	2S	1XU2 AA	9B	91VU 121	1900VC	3	132	24-21-02	ALL		
2421-7052 B			TK 22	1464	2S	1XU2 AB	14B	91VU 121	1900VC	10	132	24-21-02	ALL		
2421-7052 R			TK 22	1464	2S	1XU2 AB	14A	91VU 121	1900VC	9	132	24-21-02	ALL		
2421-7053 B			UD 22	1370	1S	1XU1 AA	9A	91VU 121	1907VC	4	131	24-21-01	ALL		
2421-7053 R			UD 22	1370	1S	1XU1 AA	8A	91VU 121	1907VC	2	131	24-21-01	ALL		
2421-7053 Y			UD 22	1370	1S	1XU1 AA	9B	91VU 121	1907VC	3	131	24-21-01	ALL		
2421-7055 B			TK 22	1370	1S	1XU1 AB	14B	91VU 121	1907VC	10	131	24-21-01	ALL		
2421-7055 R			TK 22	1370	1S	1XU1 AB	14A	91VU 121	1907VC	9	131	24-21-01	ALL		
2421-7056 B			UD 22	400	2S	405VC2	3	424	414VC A	5	621	24-21-02	ALL		
2421-7056 R			UD 22	400	2S	405VC2	1	424	414VC A	8	621	24-21-02	ALL		
2421-7056 Y			UD 22	400	2S	405VC2	4	424	414VC A	7	621	24-21-02	ALL		

AIBN MASTER WIRE LIST May 01/98 91-92-42 PAGE 8

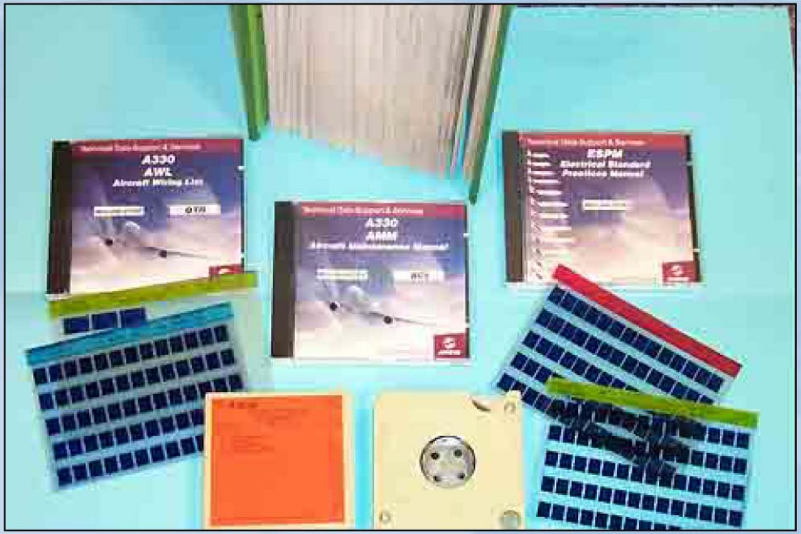
WDM DETAILS - AWL

WIRING DIAGRAM MANUAL (WDM)

WDM DETAILS (continued)

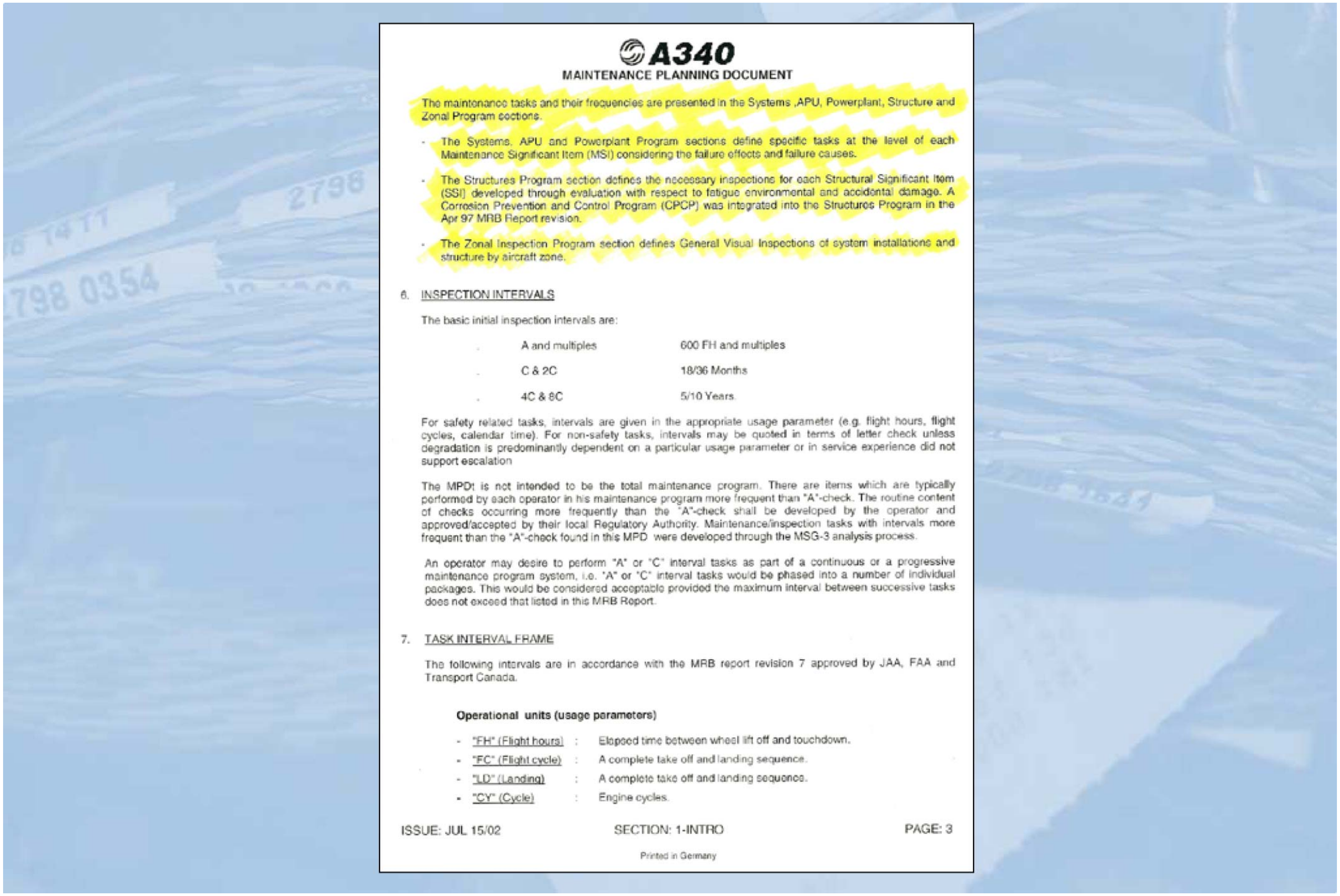
Other manuals

In order to complete knowledge on documentary environment, let's have a look at other manuals for additional information.
MPD manual stands for Maintenance Planning Document.
This manual provides scheduled maintenance tasks and their frequencies.
These maintenance tasks are presented in the APU system and Power Plant, structure, and Zonal Inspection Program.
General content of MPD.
Example of MPD page.
Let's follow with the CML: Consumable Material List.
For example, you have on the ESPM a product referenced Mat. 19-018.
MAT. 19-018
Details on the product are given in the CML as shown.
And finally, let's see the Standard Manual (SM).
The Standard Manual gives information on the specification (eg: NSA932030) and interchangeable list.
This list is a two-way interchangeable list. For example, the NSA specification shown has for equivalence an ABS specification.



WDM DETAILS - OTHER MANUALS

WDM DETAILS - OTHER MANUALS



A340

MAINTENANCE PLANNING DOCUMENT

The maintenance tasks and their frequencies are presented in the Systems ,APU, Powerplant, Structure and Zonal Program sections.

- The Systems, APU and Powerplant Program sections define specific tasks at the level of each Maintenance Significant Item (MSI) considering the failure effects and failure causes.
- The Structures Program section defines the necessary inspections for each Structural Significant Item (SSI) developed through evaluation with respect to fatigue environmental and accidental damage. A Corrosion Prevention and Control Program (CPCP) was integrated into the Structures Program in the Apr 97 MRB Report revision.
- The Zonal Inspection Program section defines General Visual Inspections of system installations and structure by aircraft zone.

6. INSPECTION INTERVALS

The basic initial inspection intervals are:

A and multiples	600 FH and multiples
C & 2C	18/36 Months
4C & 8C	5/10 Years

For safety related tasks, intervals are given in the appropriate usage parameter (e.g. flight hours, flight cycles, calendar time). For non-safety tasks, intervals may be quoted in terms of letter check unless degradation is predominantly dependent on a particular usage parameter or in service experience did not support escalation

The MPDt is not intended to be the total maintenance program. There are items which are typically performed by each operator in his maintenance program more frequent than "A"-check. The routine content of checks occurring more frequently than the "A"-check shall be developed by the operator and approved/accepted by their local Regulatory Authority. Maintenance/inspection tasks with intervals more frequent than the "A"-check found in this MPD were developed through the MSG-3 analysis process.

An operator may desire to perform "A" or "C" interval tasks as part of a continuous or a progressive maintenance program system, i.e. "A" or "C" interval tasks would be phased into a number of individual packages. This would be considered acceptable provided the maximum interval between successive tasks does not exceed that listed in this MRB Report.

7. TASK INTERVAL FRAME

The following intervals are in accordance with the MRB report revision 7 approved by JAA, FAA and Transport Canada.

Operational units (usage parameters)

- "FH" (Flight hours) : Elapsed time between wheel lift off and touchdown.
- "FC" (Flight cycle) : A complete take off and landing sequence.
- "LD" (Landing) : A complete take off and landing sequence.
- "CY" (Cycle) : Engine cycles.

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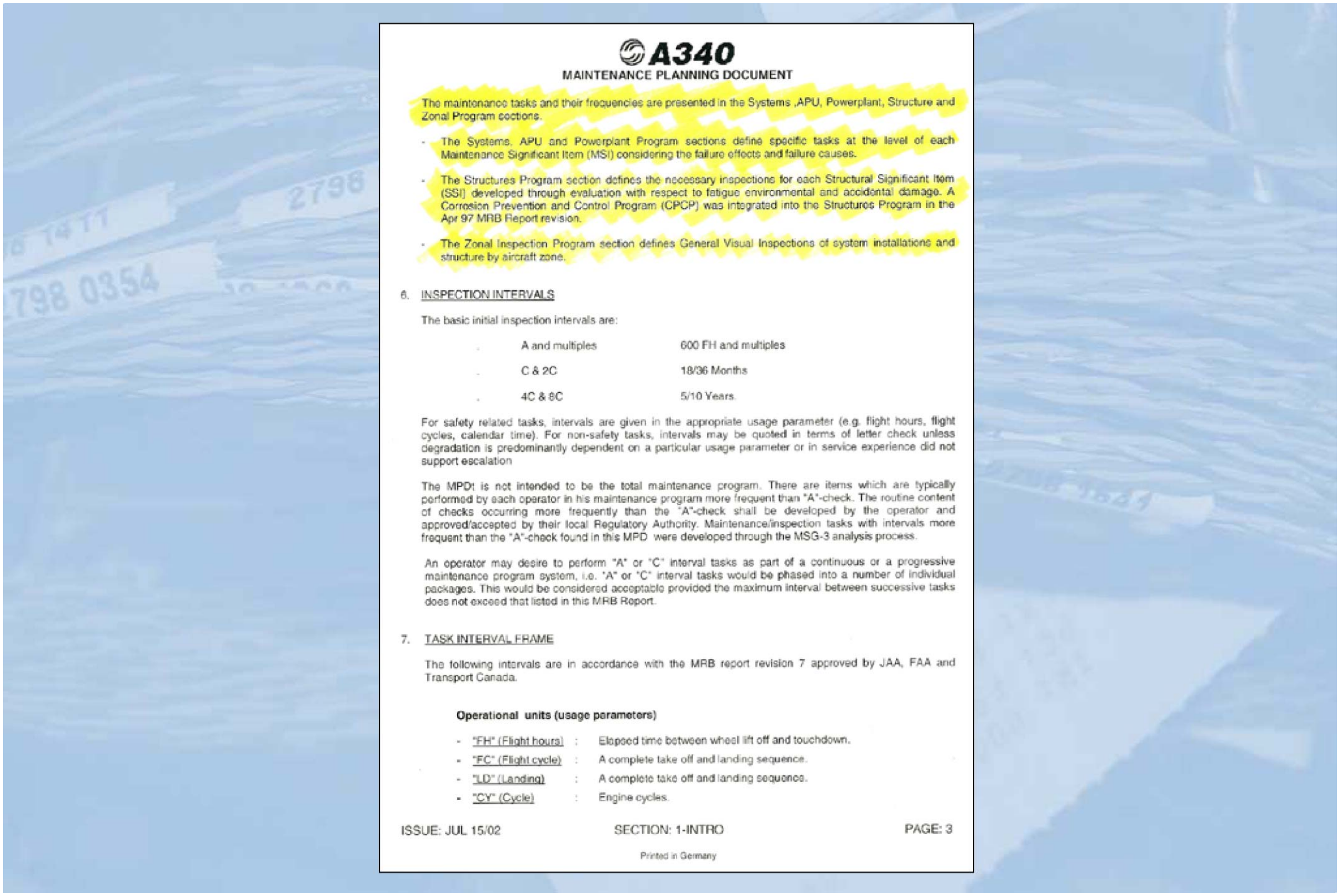
WDM DETAILS - OTHER MANUALS



A340
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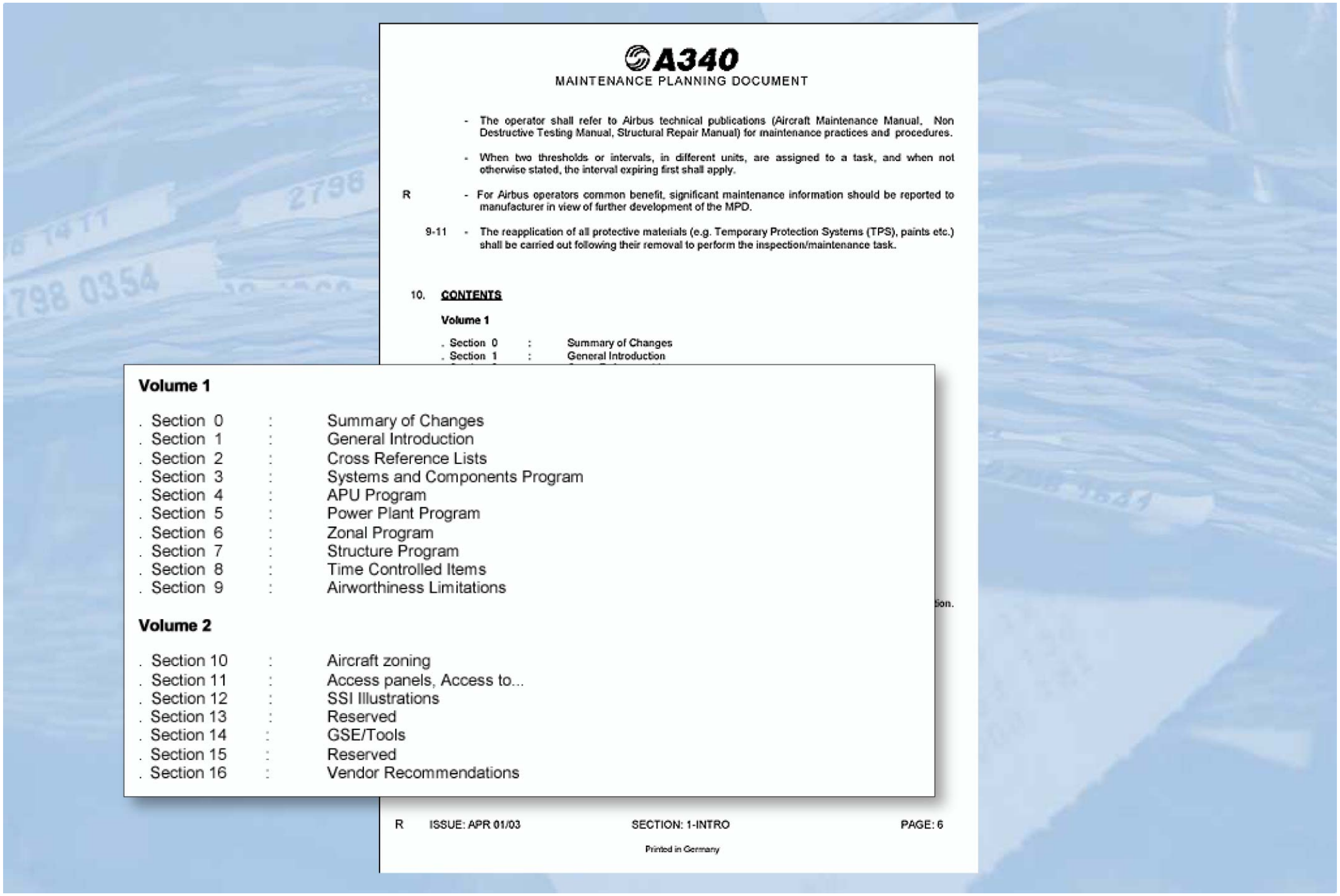

A340
MAINTENANCE PLANNING DOCUMENT

- The operator shall refer to Airbus technical publications (Aircraft Maintenance Manual, Non Destructive Testing Manual, Structural Repair Manual) for maintenance practices and procedures.
- When two thresholds or intervals, in different units, are assigned to a task, and when not otherwise stated, the interval expiring first shall apply.

R - For Airbus operators common benefit, significant maintenance information should be reported to manufacturer in view of further development of the MPD.

9-11 - The reapplication of all protective materials (e.g. Temporary Protection Systems (TPS), paints etc.) shall be carried out following their removal to perform the inspection/maintenance task.

10. **CONTENTS**

Volume 1

. Section 0 : Summary of Changes
. Section 1 : General Introduction

...tion.

R ISSUE: APR 01/03 SECTION: 1-INTRO PAGE: 6

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Volume 1

. Section 0	:	Summary of Changes
. Section 1	:	General Introduction
. Section 2	:	Cross Reference Lists
. Section 3	:	Systems and Components Program
. Section 4	:	APU Program
. Section 5	:	Power Plant Program
. Section 6	:	Zonal Program
. Section 7	:	Structure Program
. Section 8	:	Time Controlled Items
. Section 9	:	Airworthiness Limitations

Volume 2

. Section 10	:	Aircraft zoning
. Section 11	:	Access panels, Access to...
. Section 12	:	SSI Illustrations
. Section 13	:	Reserved
. Section 14	:	GSE/Tools
. Section 15	:	Reserved
. Section 16	:	Vendor Recommendations

WDM DETAILS - OTHER MANUALS

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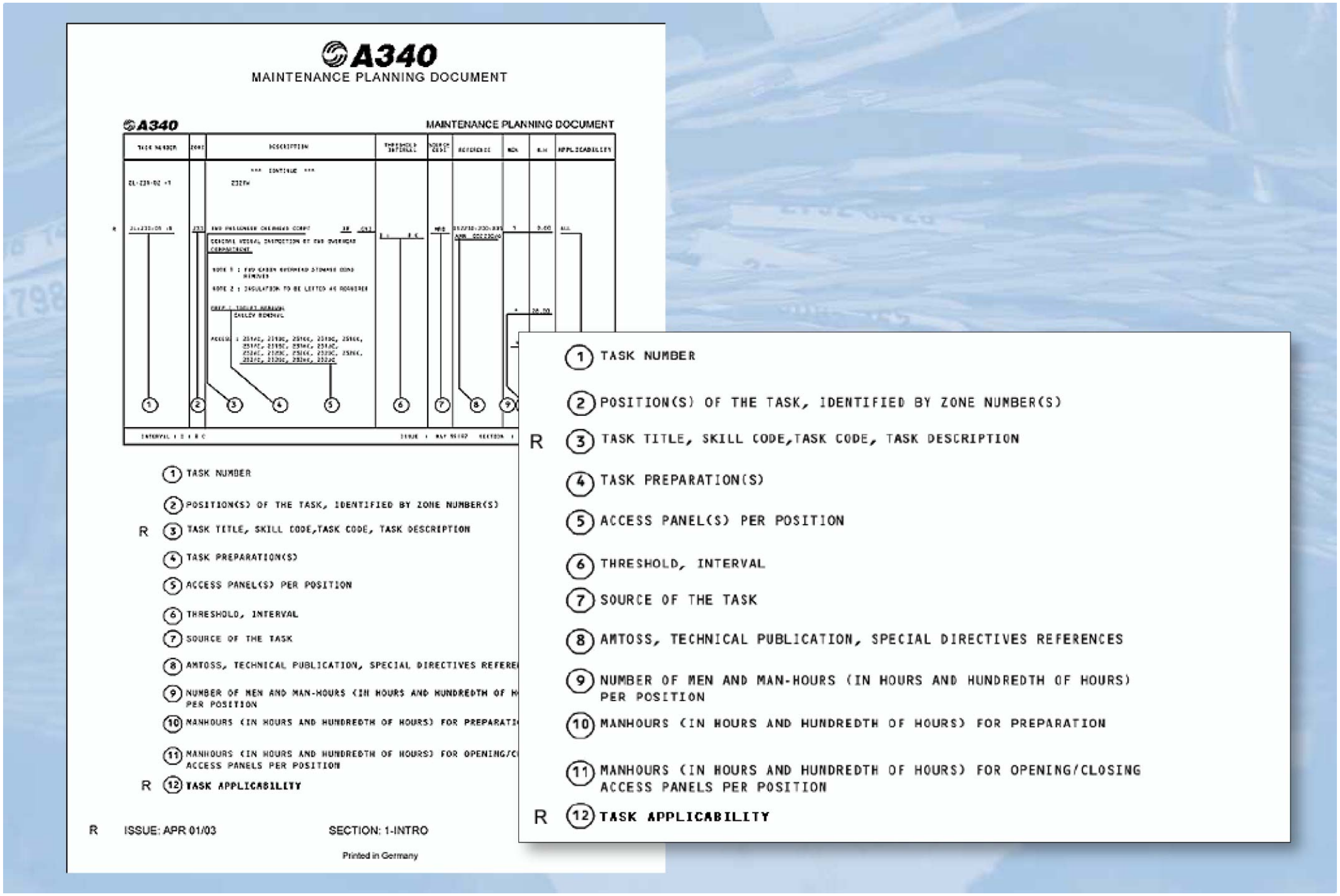

WDM DETAILS - OTHER MANUALS

X8U08481 - X0332T0 - XM2011000000001

AIRBUS INDUSTRIE

AIRBUS

Consumable Material List

CML

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Technical Data And Documentation
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FRANCE

Reference : CML **Issue** : Mar 01

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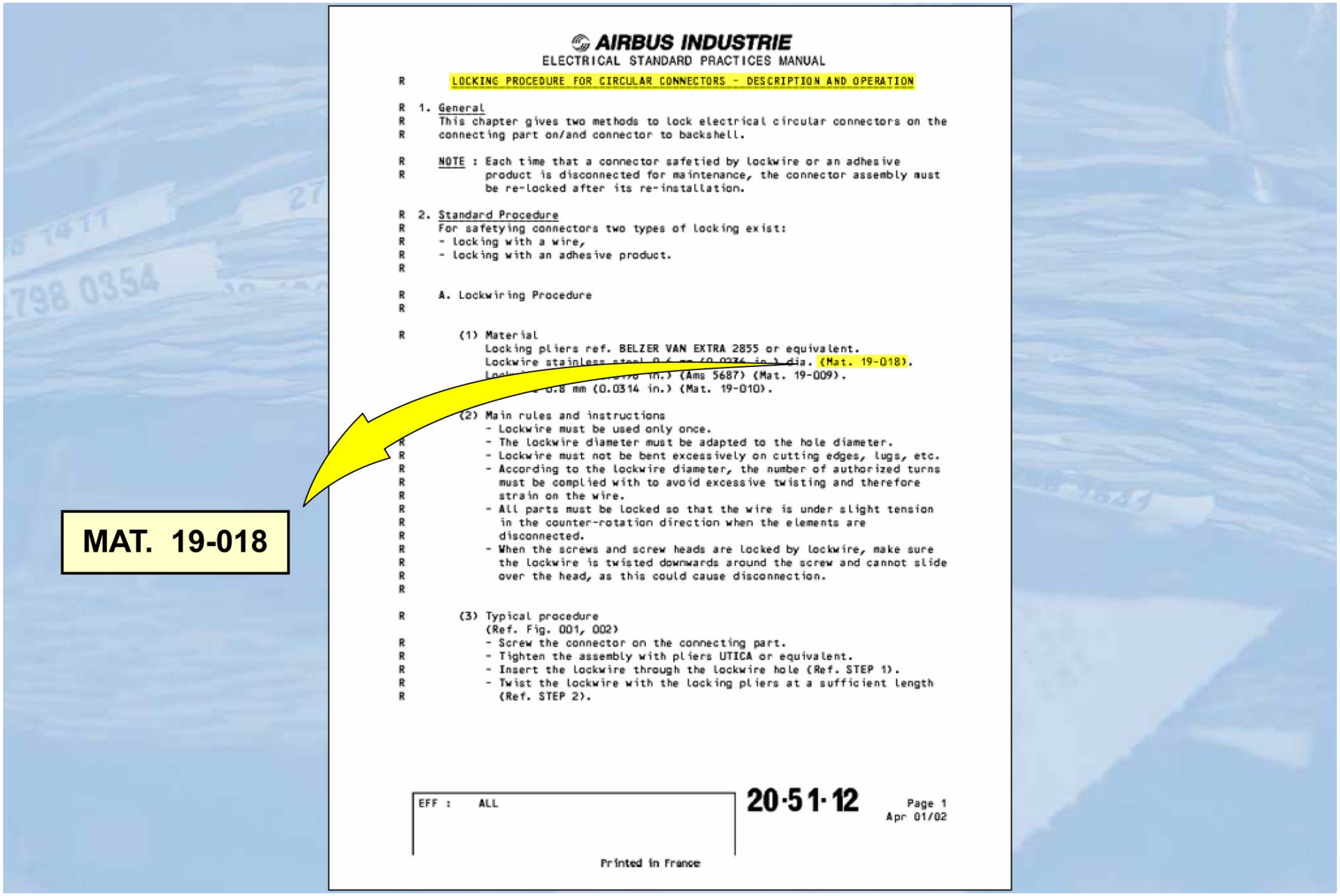

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

LOCKING PROCEDURE FOR CIRCULAR CONNECTORS - DESCRIPTION AND OPERATION

1. General
This chapter gives two methods to lock electrical circular connectors on the connecting part on/and connector to backshell.

NOTE : Each time that a connector safetied by lockwire or an adhesive product is disconnected for maintenance, the connector assembly must be re-locked after its re-installation.

2. Standard Procedure
For safetying connectors two types of locking exist:
- locking with a wire,
- locking with an adhesive product.

A. Lockwiring Procedure

(1) Material
Locking pliers ref. BELZER VAN EXTRA 2855 or equivalent.
Lockwire stainless steel 0.6 mm (0.0236 in.) dia. (Mat. 19-018).
Lock[illegible] in.) (Ams 5687) (Mat. 19-009).
[illegible] 0.8 mm (0.0314 in.) (Mat. 19-010).

(2) Main rules and instructions
- Lockwire must be used only once.
- The lockwire diameter must be adapted to the hole diameter.
- Lockwire must not be bent excessively on cutting edges, lugs, etc.
- According to the lockwire diameter, the number of authorized turns must be complied with to avoid excessive twisting and therefore strain on the wire.
- All parts must be locked so that the wire is under slight tension in the counter-rotation direction when the elements are disconnected.
- When the screws and screw heads are locked by lockwire, make sure the lockwire is twisted downwards around the screw and cannot slide over the head, as this could cause disconnection.

(3) Typical procedure
(Ref. Fig. 001, 002)
- Screw the connector on the connecting part.
- Tighten the assembly with pliers UTICA or equivalent.
- Insert the lockwire through the lockwire hole (Ref. STEP 1).
- Twist the lockwire with the locking pliers at a sufficient length (Ref. STEP 2).

EFF : ALL

20-51-12 Page 1
Apr 01/02

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WDM DETAILS - OTHER MANUALS

AIRBUS INDUSTRIE - CONSUMABLE MATERIAL LIST (CML) - SECTION : 19 - MISCELLANEOUS

Ref. item	Material/Product Supplier design./ description	Specification and/or Supplier s ref.	Supplier code	CML cat	Spl Lbl Y/N	Flash Point C(F)	Packaging, Shelf life, Transport, Remarks	Doc Code	Effective for a/c type
19-018	LOCKWIRE 0.6 MM	REF | LOCKWIRE | STAINLESS STEEL | 0.6 MM DIA D | LN 9424 GB | DTD-189 USA | AMS 5687	LOCAL PURCHASE	C	N		TR = NO LIMITATIONS REF.IATA REGULATIONS		

UTILIZATION RECOMMENDATIONS/RESTRICTIONS :

"ACCORDING TO DATA SHEET"

	52-36-11-2D671							
R	52-12-11-2D671							
	52-36-18-2D671							
R	21-52-31-401	27-23-51-401						
R	36-11-43-401	36-12-42-401						
	28-21-53-401							
R	36-11-15-401	36-11-54-401						
R	21-52-32-401	21-53-11-401	21-53-12-401	25-32-42-401	25-32-62-401	25-32-63-401	AMM	330 340
R	25-32-64-401	25-32-69-401	25-32-75-401	25-32-82-401	25-33-52-401	25-33-53-401	AMM	330 340
R	25-33-54-401	25-33-56-401	25-33-57-401	26-22-42-401	27-41-00-501	27-44-00-501	AMM	330 340
R	27-44-53-401	27-44-54-501	27-44-57-401	29-14-44-401	29-21-15-401	29-21-51-401	AMM	330 340
R	29-22-15-401	29-22-51-401	29-23-15-401	29-23-51-401	29-24-00-201	29-24-56-401	AMM	330 340
	32-31-19-401	32-33-14-401	36-22-15-401	49-11-11-401	49-12-41-401	49-16-51-201	AMM	330 340
	52-71-18-401						AMM	330 340
R	25-26-42-401	25-31-51-401	25-31-52-401	25-31-53-401	25-31-59-401	25-31-62-401	AMM	330
R	25-31-63-401	25-32-61-401	25-33-62-401	53-35-43-401	53-39-42-401		AMM	330

AIB Printed in France PAGE 1-021 - SEP 01/02

19-018 LOCKWIRE 0.6 MM |REF|LOCKWIRE
|STAINLESS STEEL
| 0.6 MM DIA
|D |LN 9424
|GB |DTD-189
|USA|AMS 5687

WDM DETAILS - OTHER MANUALS

AIRBUS

STANDARDS MANUAL

SM

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FRANCE

Reference: X SM

Issue: Sep 87

WDM DETAILS - OTHER MANUALS

AIRBUS INDUSTRIE

STANDARDS MANUAL

aerospatiale DIVISION AVIONS NORMALISATION	SWITCH - LIMIT, BIPOLAR SEALED CONTACT AND MECHANISM	NSA932030 PAGE

Dimensions en mm

TECHNICAL SPECIFICATION : As per AIR 8462 - MIL S 8805

EXAMPLE OF PART NUMBER IDENTIFICATION TO BE USED ON DRAWINGS :

NSA932030-01 , Limit switch

EXAMPLE OF PART NUMBER CONSTRUCTION :

NSA932030-01

Standard Nr —— NSA932030; Device code Nr —— 01

GENERAL CHARACTERISTICS :

DEFINITION : Sealed, fast cutoff bipolar switch. When no bearing load is present, the mechanism returns to the idle position. Long travel model.

USE : It provides control of 2 separate electric circuits from various mechanisms and at rigorously defined points (within the tolerance limitations). This accessory meets the tropic-proofing standards, it is sealed and can be submitted to external atmospheric agents. Operation is guaranteed even after icing of the power take-off.

INSTALLATION : This equipment is secured in a Ø 20,5 H7 bore as per : NSA937801-155 ; NSA937801-203 or 231 (see page 3). Mechanical drive of the accessory is achieved with rectilinear thrust. The drive component should be in the free position, release the accessory driving pin by 0,5 mm. On the other hand, the external mechanical control component should by no means use the accessory as a limit stop.

ATTACHMENT TIGHTENING TORQUE : 1 mdaN nominal

OPERATING TEMPERATURE : - 60°C to + 80°C

max. OPERATING TEMPERATURE : 25000 m

RESISTANCE TO ACCELERATIONS : 20 g

CONNECTION : As per NAS1599-10B6PN (See diagram).

SEALING : O-ring on structure.

TIGHTNESS : The mechanism and electric contacts are guaranteed tight (category $5 \cdot 10^{-8}$ as per ABD0007) by means of a boot and neutral gas.

LEAK RATE : (See page 2)

ITEM CODE Nr	TYPE OF POWER SUPPLY
01	For current from 0,5 m A to 100 m A
02 *	For current > 100 m A see intensities and voltages as a function of circuit characteristics page...
	* Identification : Green anodizing on protection sleeve

DATE D'ORIGINE : 09.63

AEROSPATIALE	Editions:				N° CLASSEMENT E.932030	NSA 932030
	A.09.68	D.06.05	E.03.89		PAGE 1	

AIRBUS

STANDARDS MANUAL

INTRODUCTION

1. GENERAL

SM PART 4 contains a cross-reference list of standard parts from SM PART 3 which are equivalent in form, fit and function (two-way interchangeable).

The standard parts contained as equivalent in SM PART 4 are defined according to technically identical requirements (product standard, technical specification etc.).
For equivalent standard part numbers, different supplier/proprietary part numbers may be stated in SM PART 3.

	INTRODUCTION		LIST OF PARTS
PAGE	1	2	1 - 234
ISSUE/REV:	03/02	05/90	03/02

Approved	Title	Classification
AIRBUS INDUSTRIE	STANDARD PARTS INTERCHANGEABLE TWO-WAY	SM PART 4 INTRODUCTION
	Issue: 01/88 Revision: 93 03/02	Page 1 of 2

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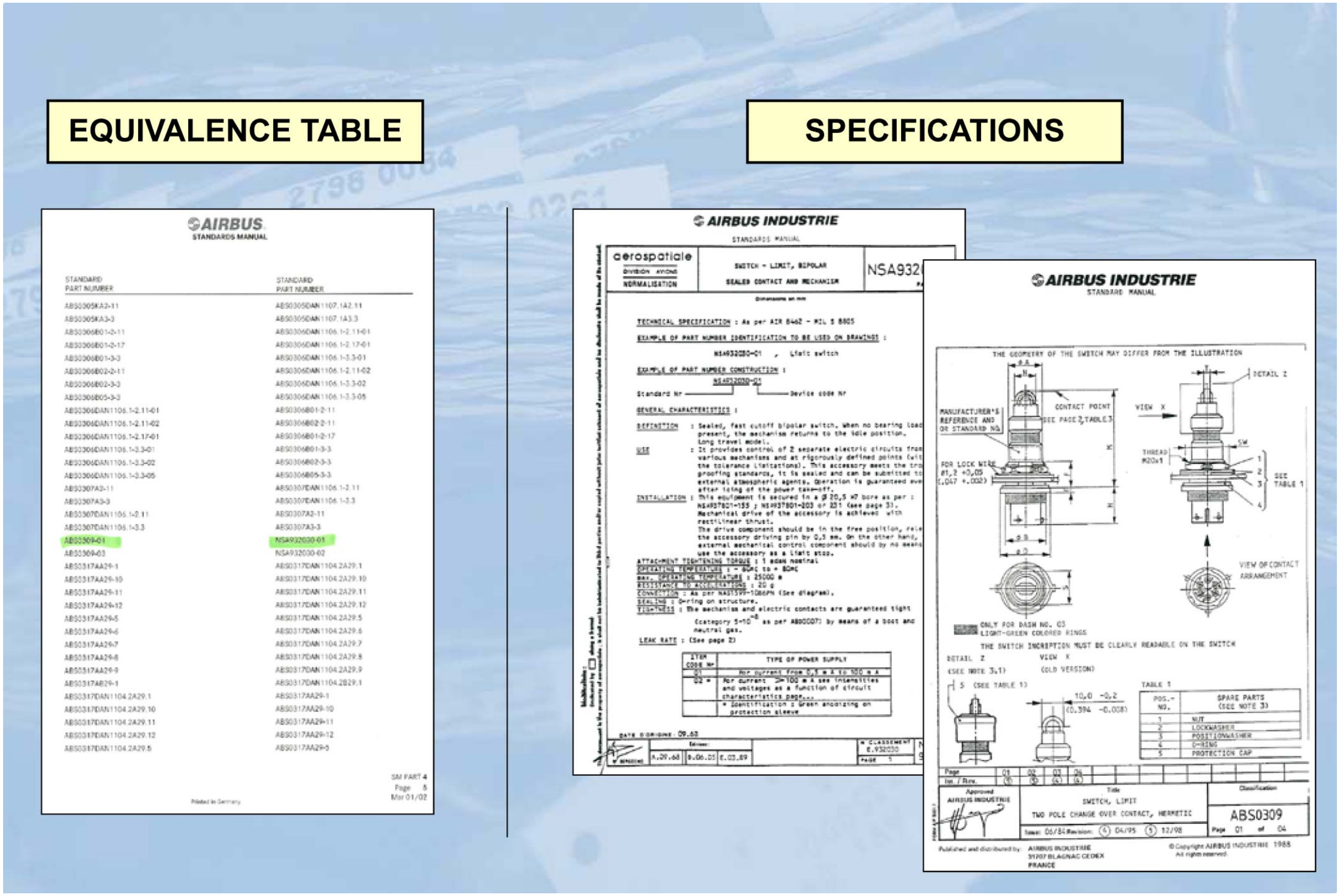

STANDARD PART NUMBER	STANDARD PART NUMBER
ABS0305KA2-11	ABS0305DAN1107.1A2.11
ABS0305KA3-3	ABS0305DAN1107.1A3.3
ABS0306B01-2-11	ABS0306DAN1106.1-2.11-01
ABS0306B01-2-17	ABS0306DAN1106.1-2.17-01
ABS0306B01-3-3	ABS0306DAN1106.1-3.3-01
ABS0306B02-2-11	ABS0306DAN1106.1-2.11-02
ABS0306B02-3-3	ABS0306DAN1106.1-3.3-02
ABS0306B05-3-3	ABS0306DAN1106.1-3.3-05
ABS0306DAN1106.1-2.11-01	ABS0306B01-2-11
ABS0306DAN1106.1-2.11-02	ABS0306B02-2-11
ABS0306DAN1106.1-2.17-01	ABS0306B01-2-17
ABS0306DAN1106.1-3.3-01	ABS0306B01-3-3
ABS0306DAN1106.1-3.3-02	ABS0306B02-3-3
ABS0306DAN1106.1-3.3-05	ABS0306B05-3-3
ABS0307A2-11	ABS0307DAN1106.1-2.11
ABS0307A3-3	ABS0307DAN1106.1-3.3
ABS0307DAN1106.1-2.11	ABS0307A2-11
ABS0307DAN1106.1-3.3	ABS0307A3-3
ABS0309-01	NSA932030-01
ABS0309-03	NSA932030-02
ABS0317AA29-1	ABS0317DAN1104.2A29.1
ABS0317AA29-10	ABS0317DAN1104.2A29.10
ABS0317AA29-11	ABS0317DAN1104.2A29.11
ABS0317AA29-12	ABS0317DAN1104.2A29.12
ABS0317AA29-5	ABS0317DAN1104.2A29.5
ABS0317AA29-6	ABS0317DAN1104.2A29.6
ABS0317AA29-7	ABS0317DAN1104.2A29.7
ABS0317AA29-8	ABS0317DAN1104.2A29.8
ABS0317AA29-9	ABS0317DAN1104.2A29.9
ABS0317AB29-1	ABS0317DAN1104.2B29.1
ABS0317DAN1104.2A29.1	ABS0317AA29-1
ABS0317DAN1104.2A29.10	ABS0317AA29-10
ABS0317DAN1104.2A29.11	ABS0317AA29-11
ABS0317DAN1104.2A29.12	ABS0317AA29-12
ABS0317DAN1104.2A29.5	ABS0317AA29-5

SM PART 4
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WDM DETAILS - OTHER MANUALS

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WIRING DIAGRAM MANUAL (WDM)

DYNAMIC WIRING IN AIRN@V MAINTENANCE

Wiring Diagram Manual (WDM)

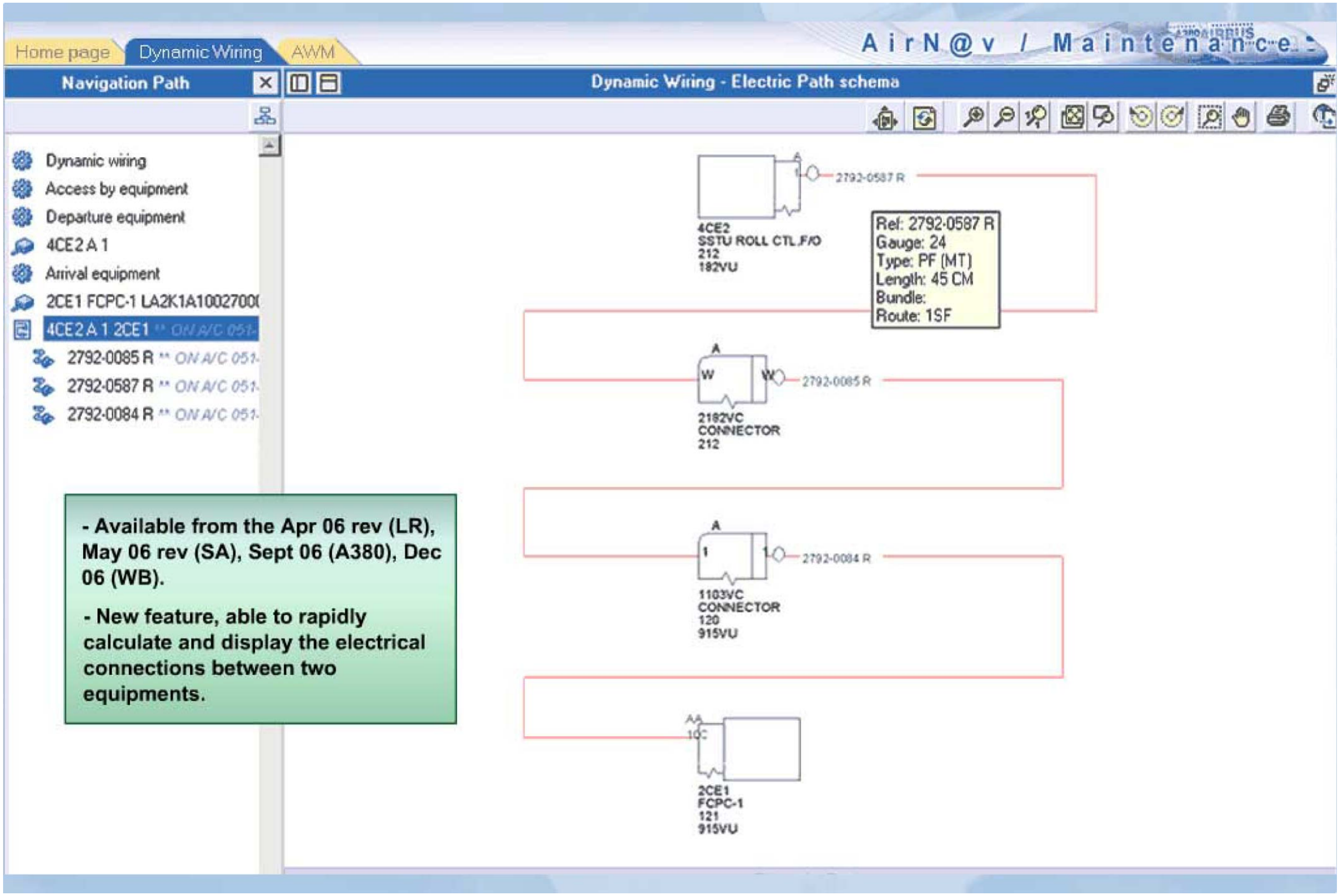
X8U08481 - X0332T0 - XM2011000000001

DYNAMIC WIRING IN AIRN@V MAINTENANCE

WIRING DIAGRAM MANUAL (WDM)

DYNAMIC WIRING IN AIRN@V MAINTENANCE (continued)

General

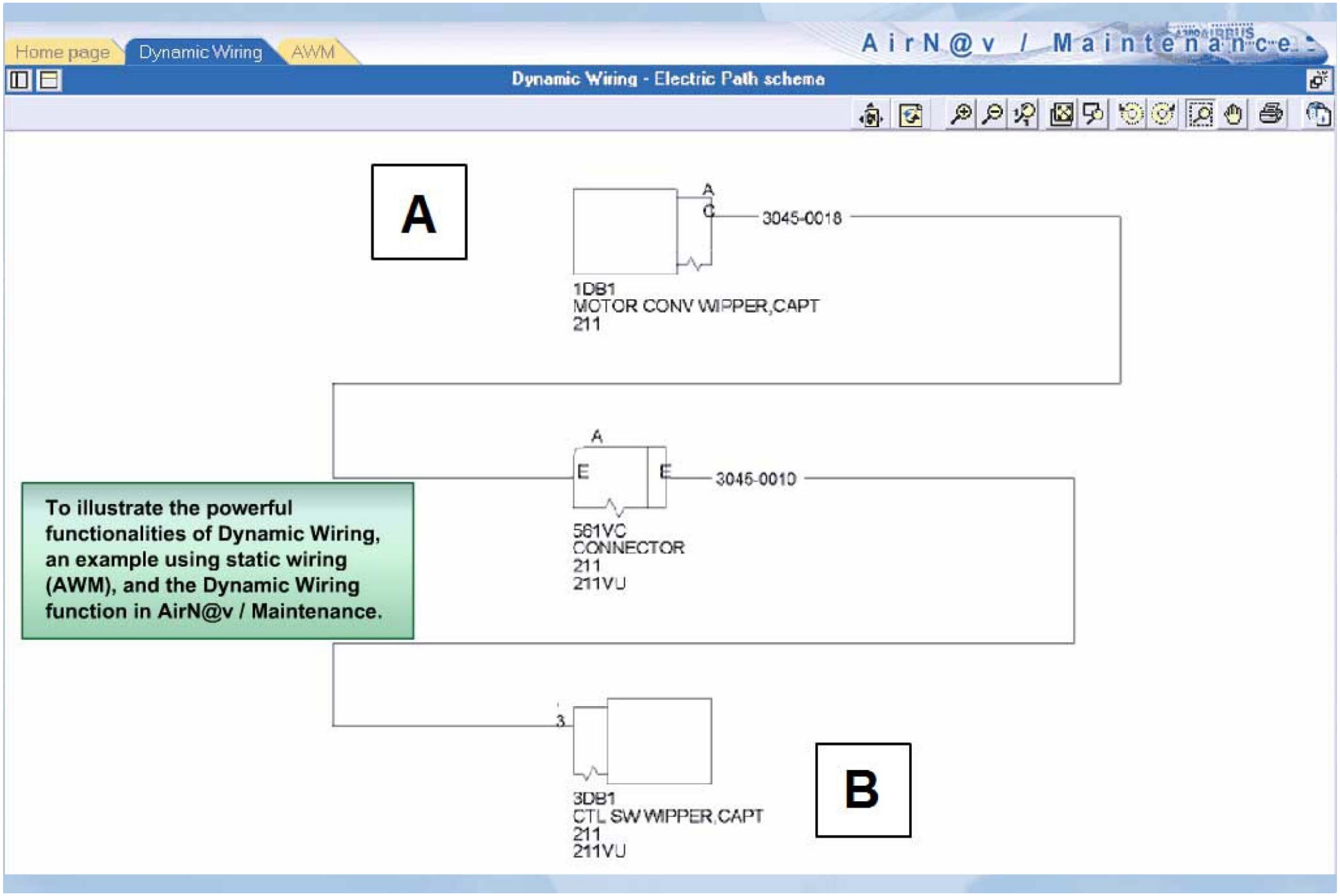


DYNAMIC WIRING IN AIRN@V MAINTENANCE - GENERAL

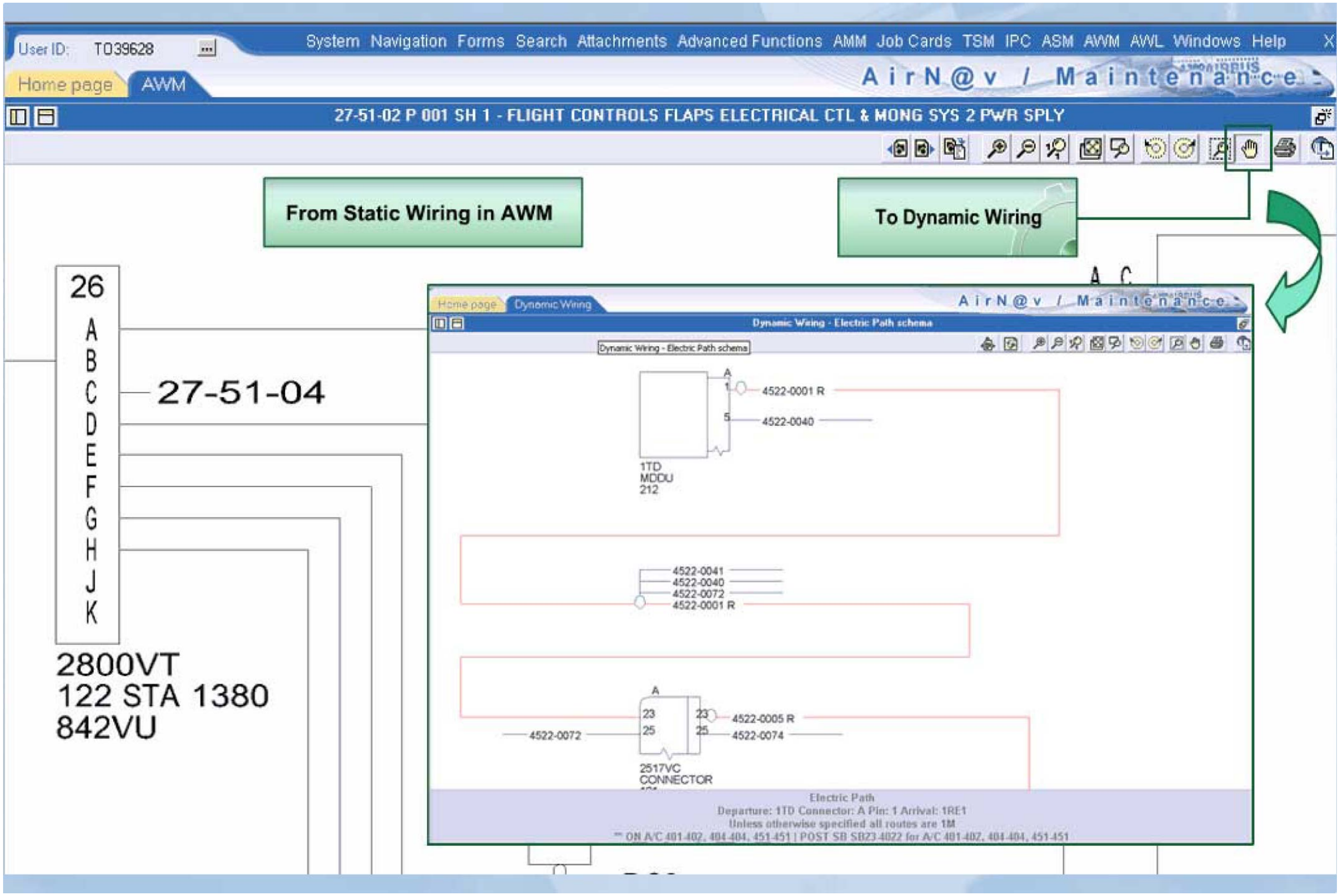
WIRING DIAGRAM MANUAL (WDM)

DYNAMIC WIRING IN AIRN@V MAINTENANCE (continued)

Dynamic Wiring versus Static Wiring

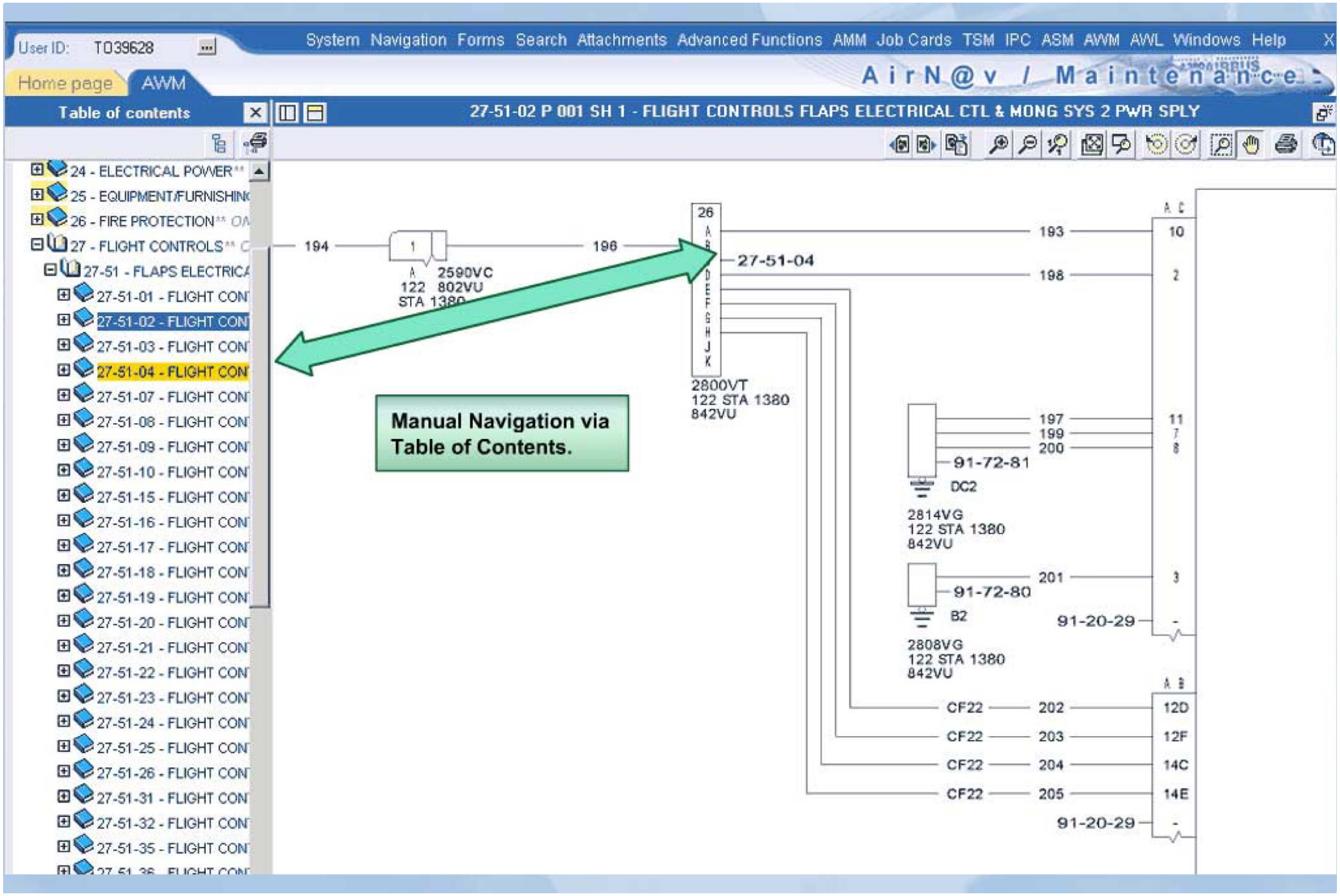


DYNAMIC WIRING IN AIRN@V MAINTENANCE - DYNAMIC WIRING VERSUS STATIC WIRING



DYNAMIC WIRING IN AIRN@V MAINTENANCE - DYNAMIC WIRING VERSUS STATIC WIRING

X8U08481 - X0332T0 - XM2011000000001



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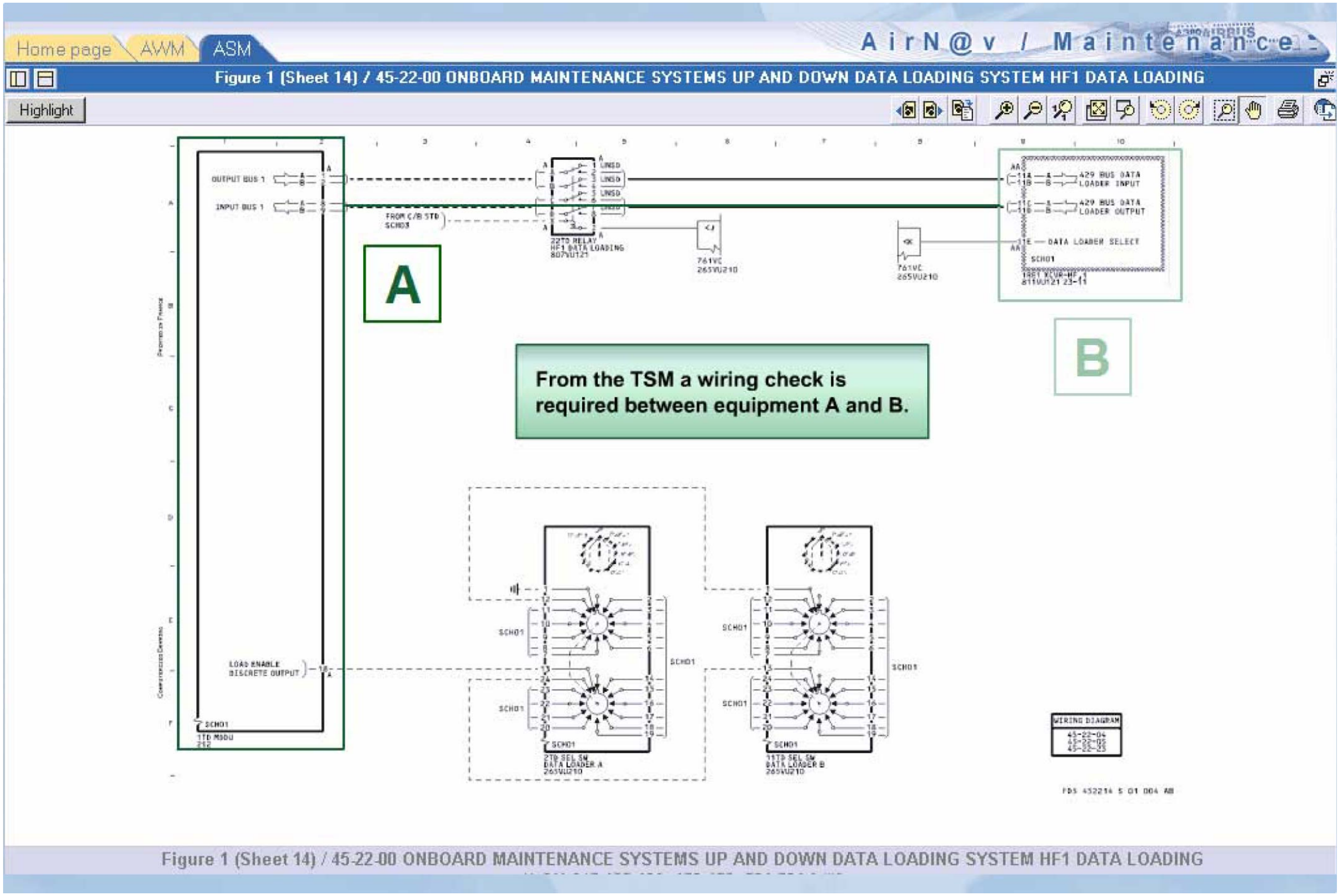

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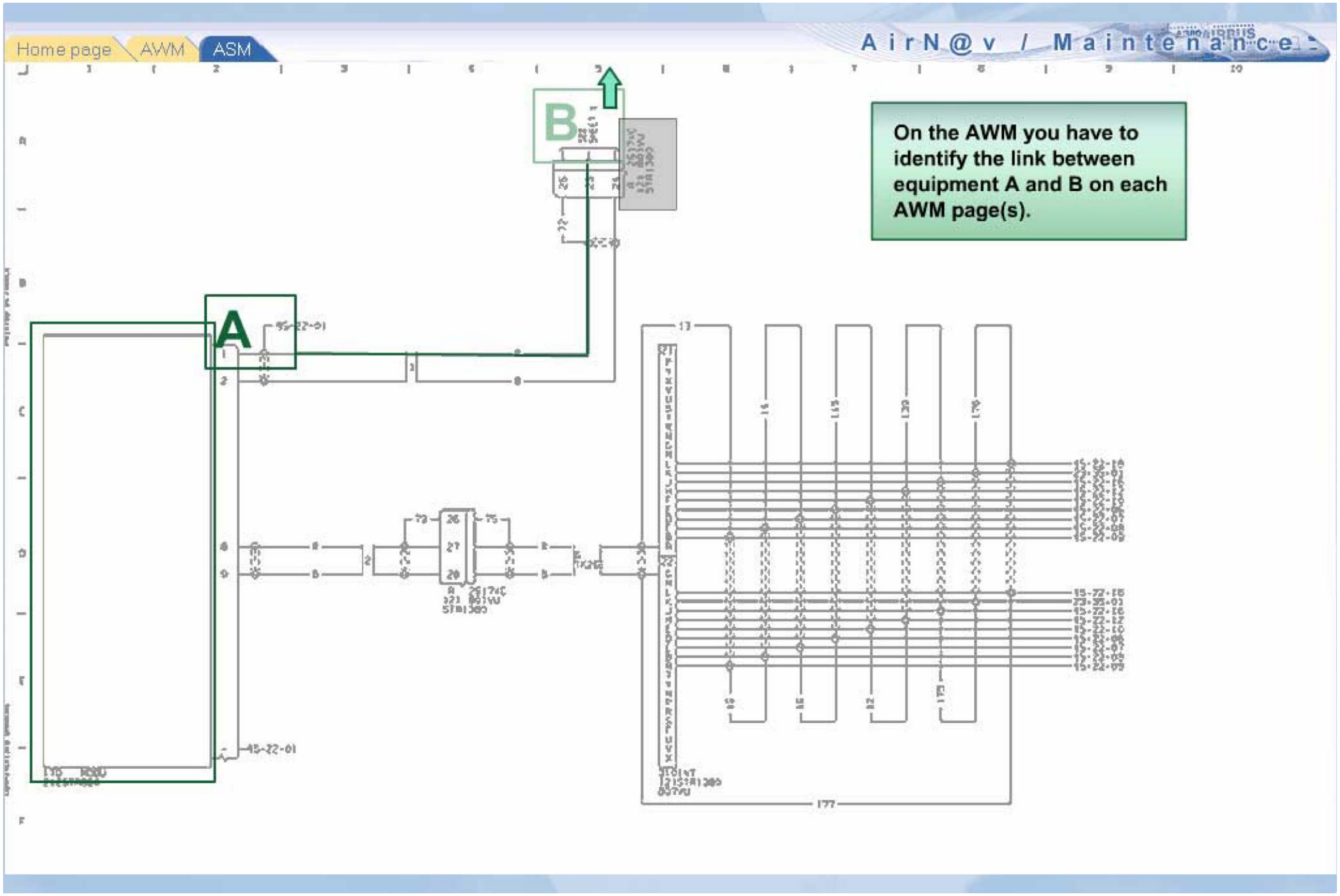
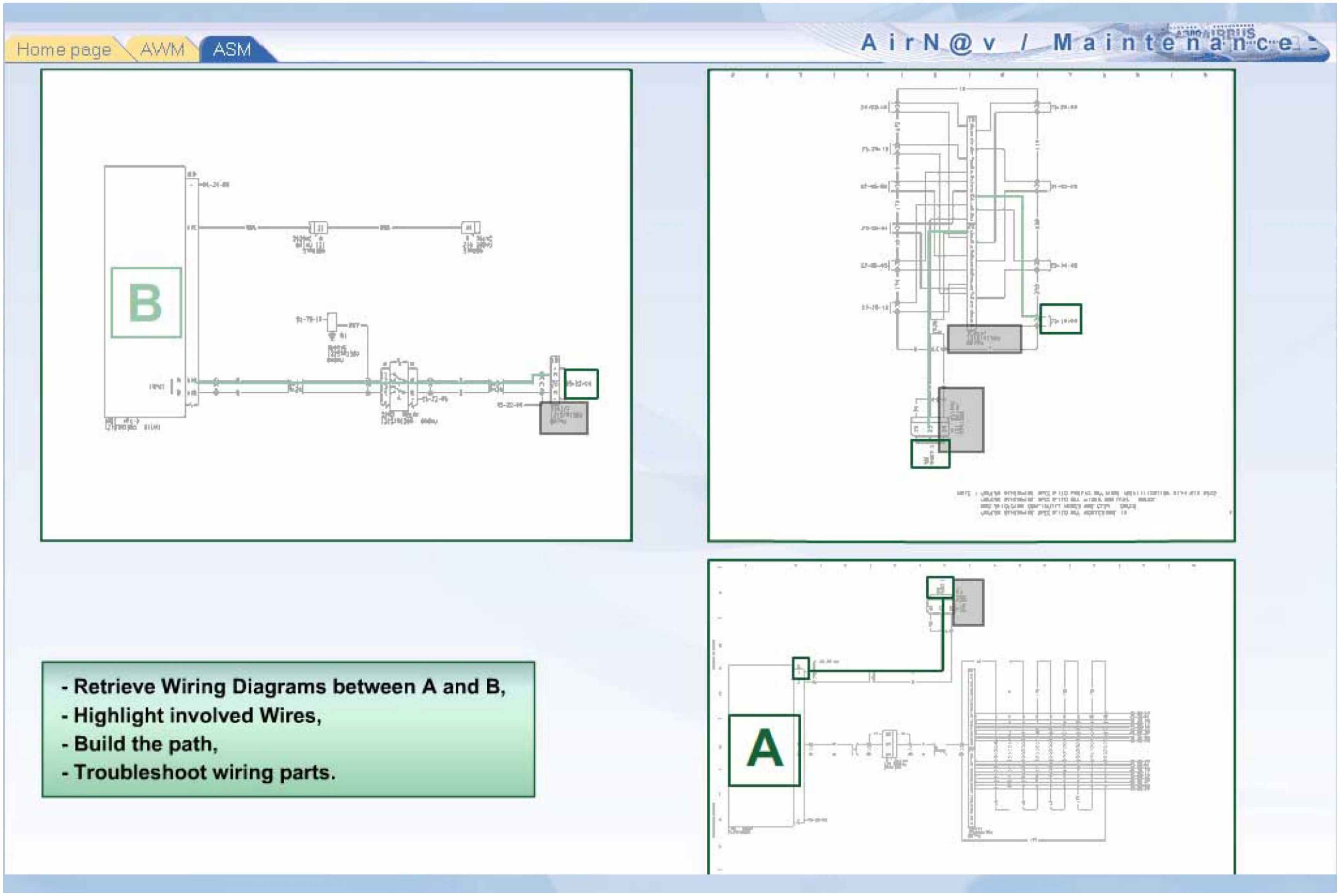


DYNAMIC WIRING IN AIRN@V MAINTENANCE - DYNAMIC WIRING VERSUS STATIC WIRING



DYNAMIC WIRING IN AIRN@V MAINTENANCE - DYNAMIC WIRING VERSUS STATIC WIRING

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WIRING DIAGRAM MANUAL (WDM)

DYNAMIC WIRING IN AIRN@V MAINTENANCE (continued)

Access to Dynamic Wiring

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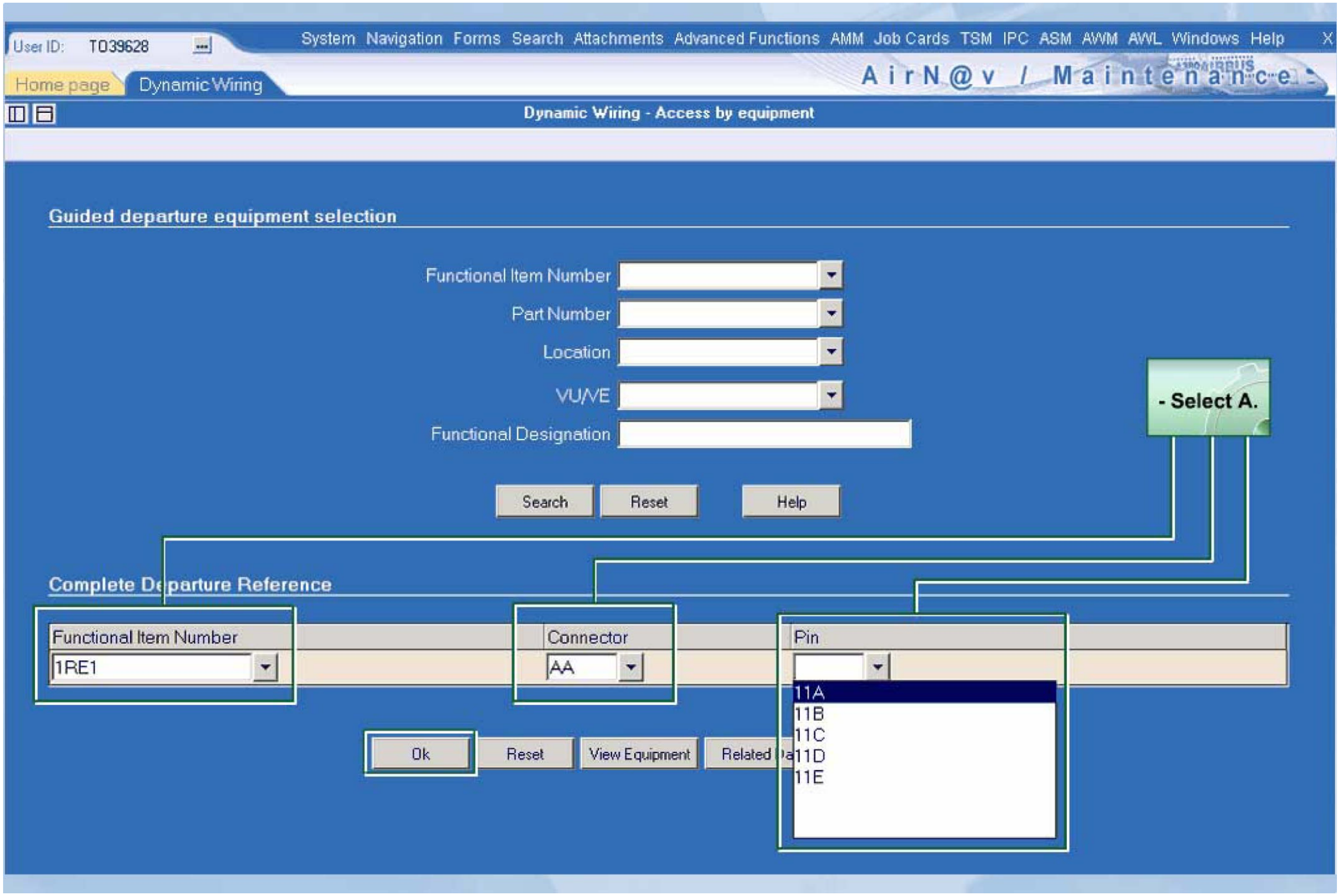
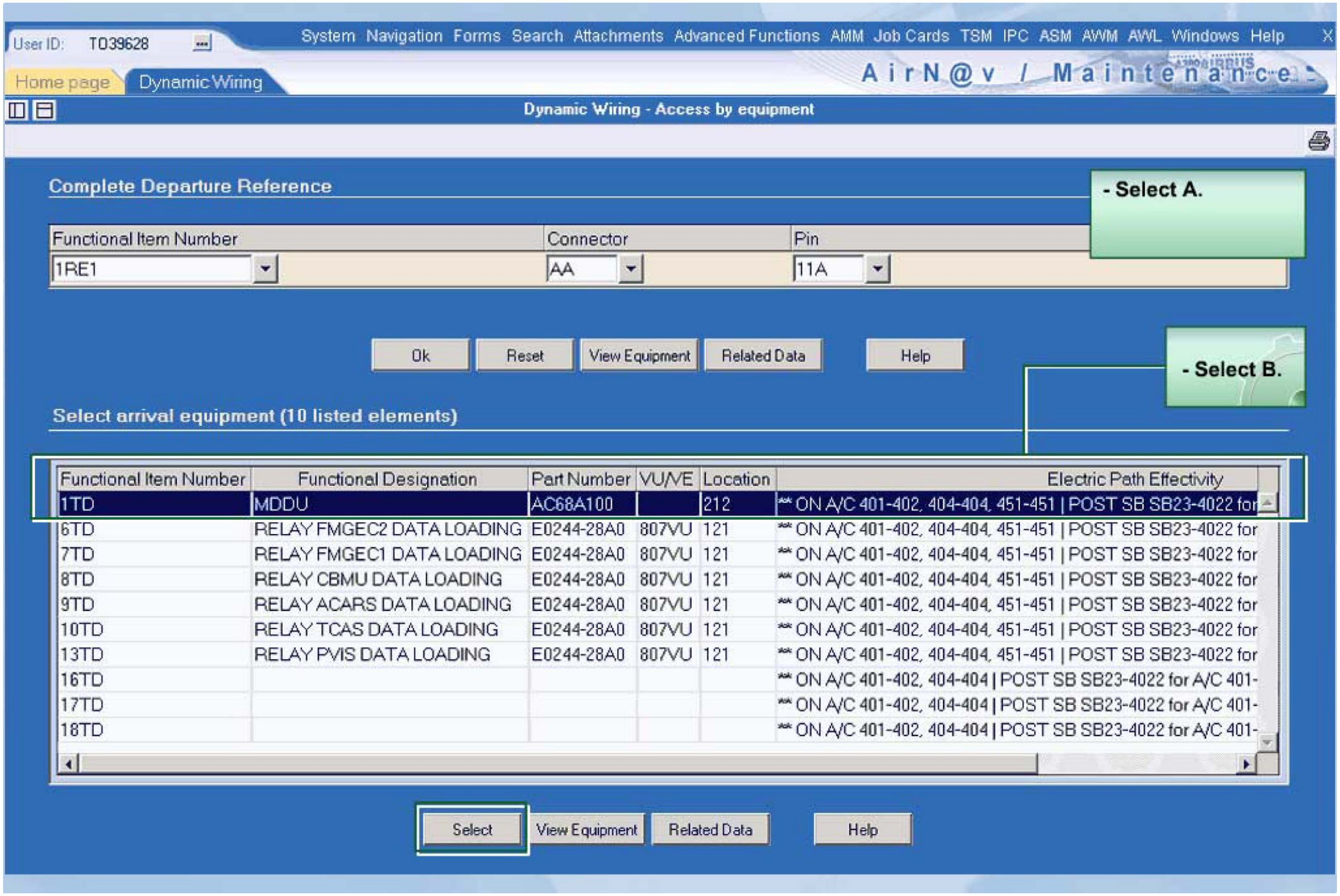


DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS TO DYNAMIC WIRING



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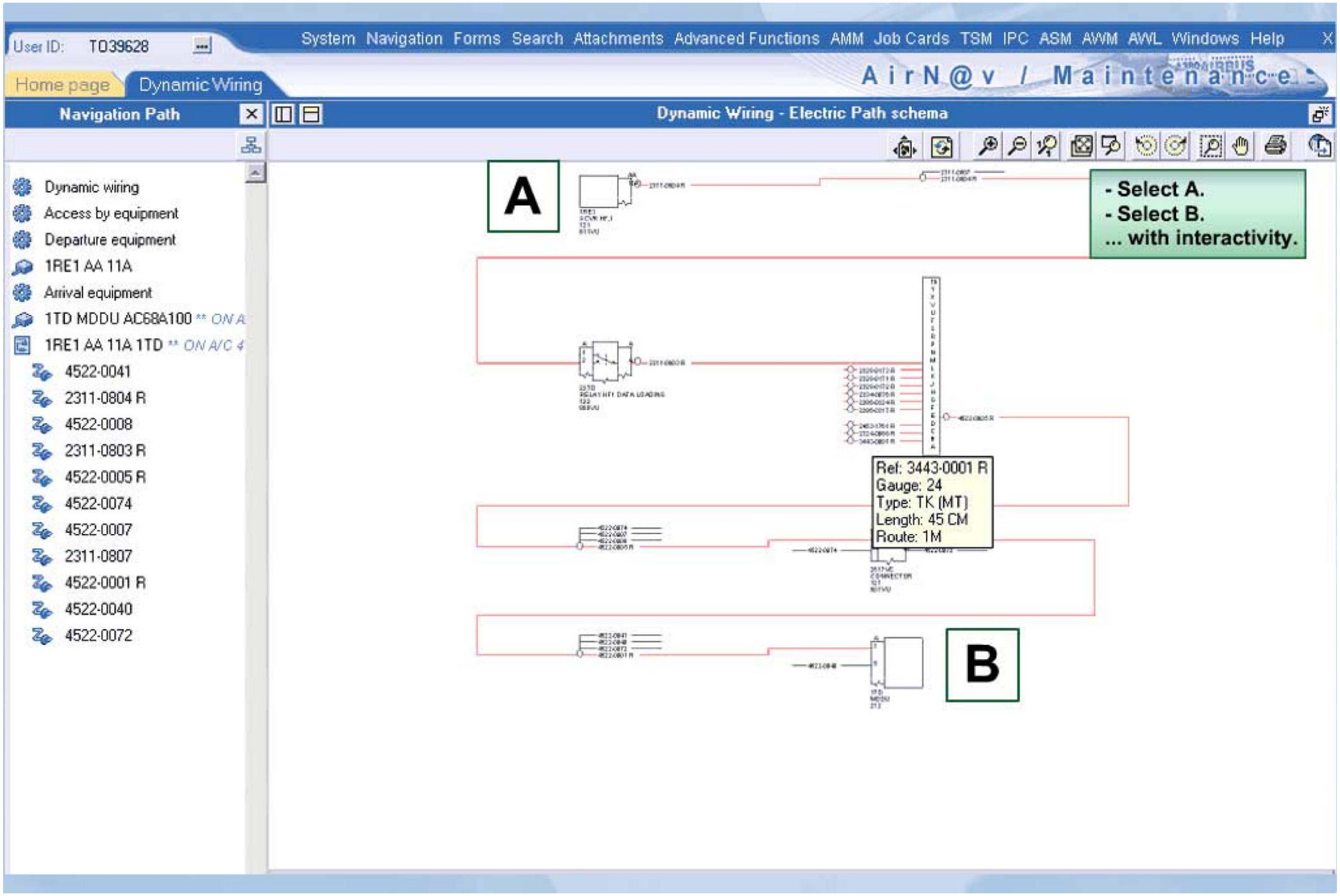
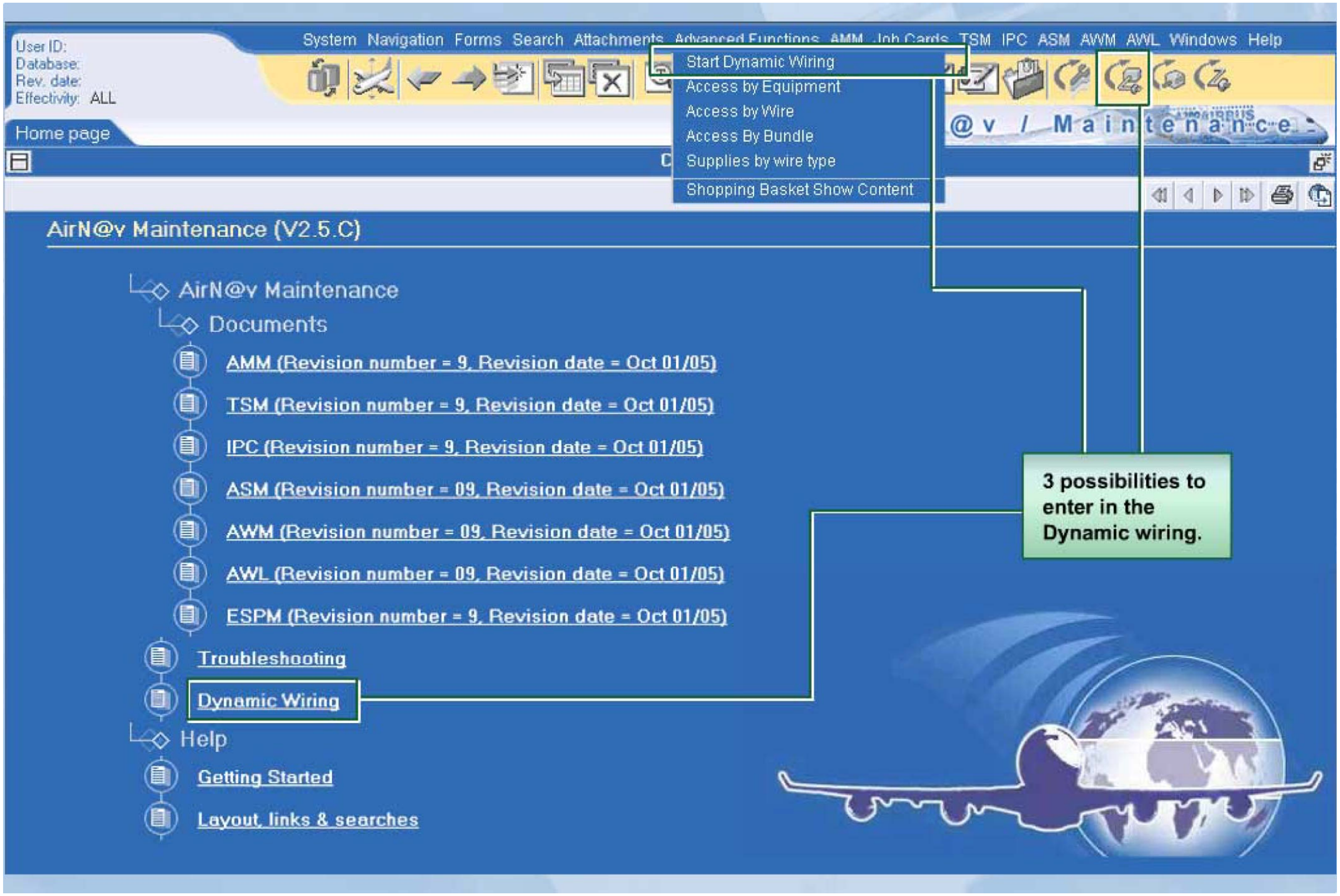
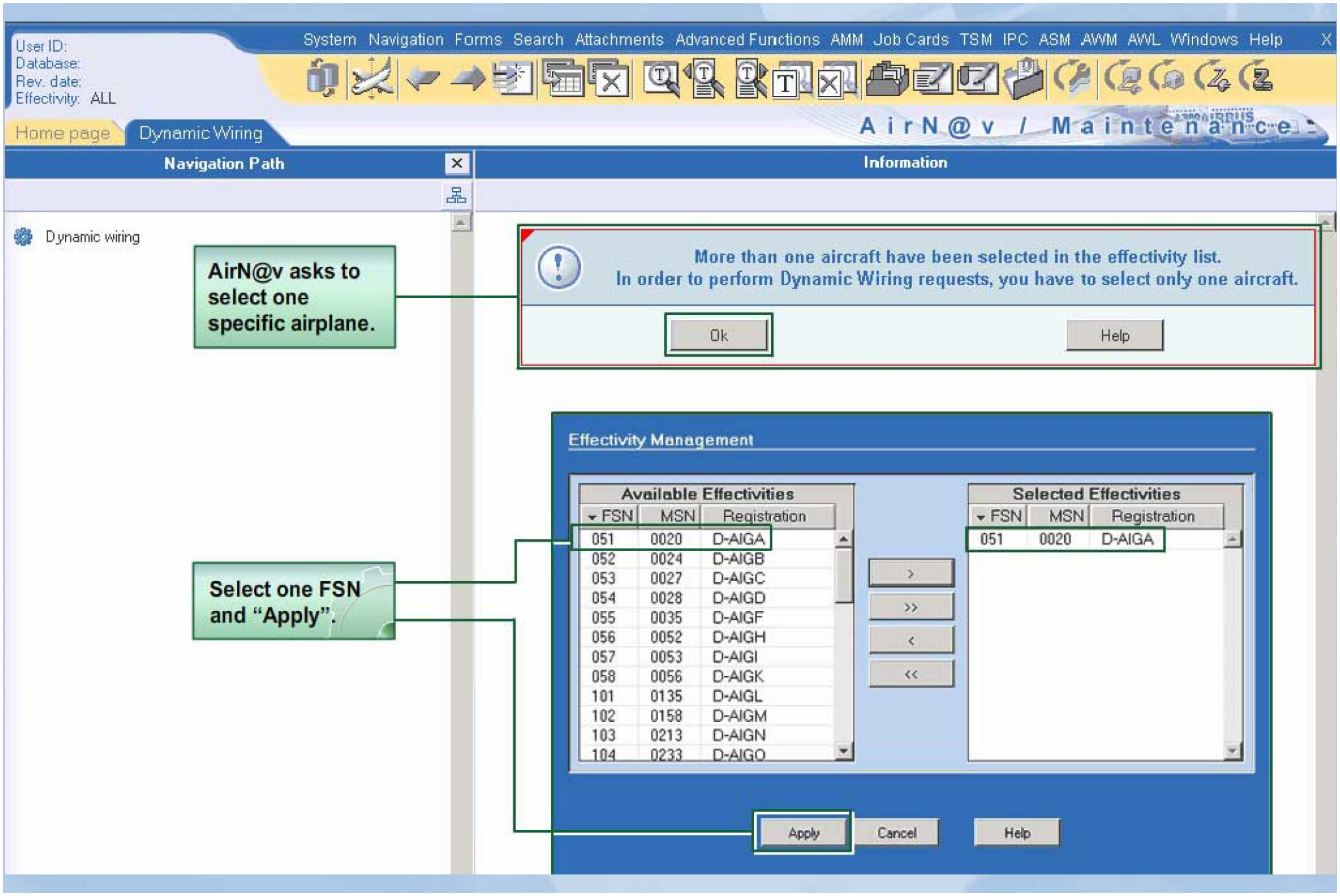


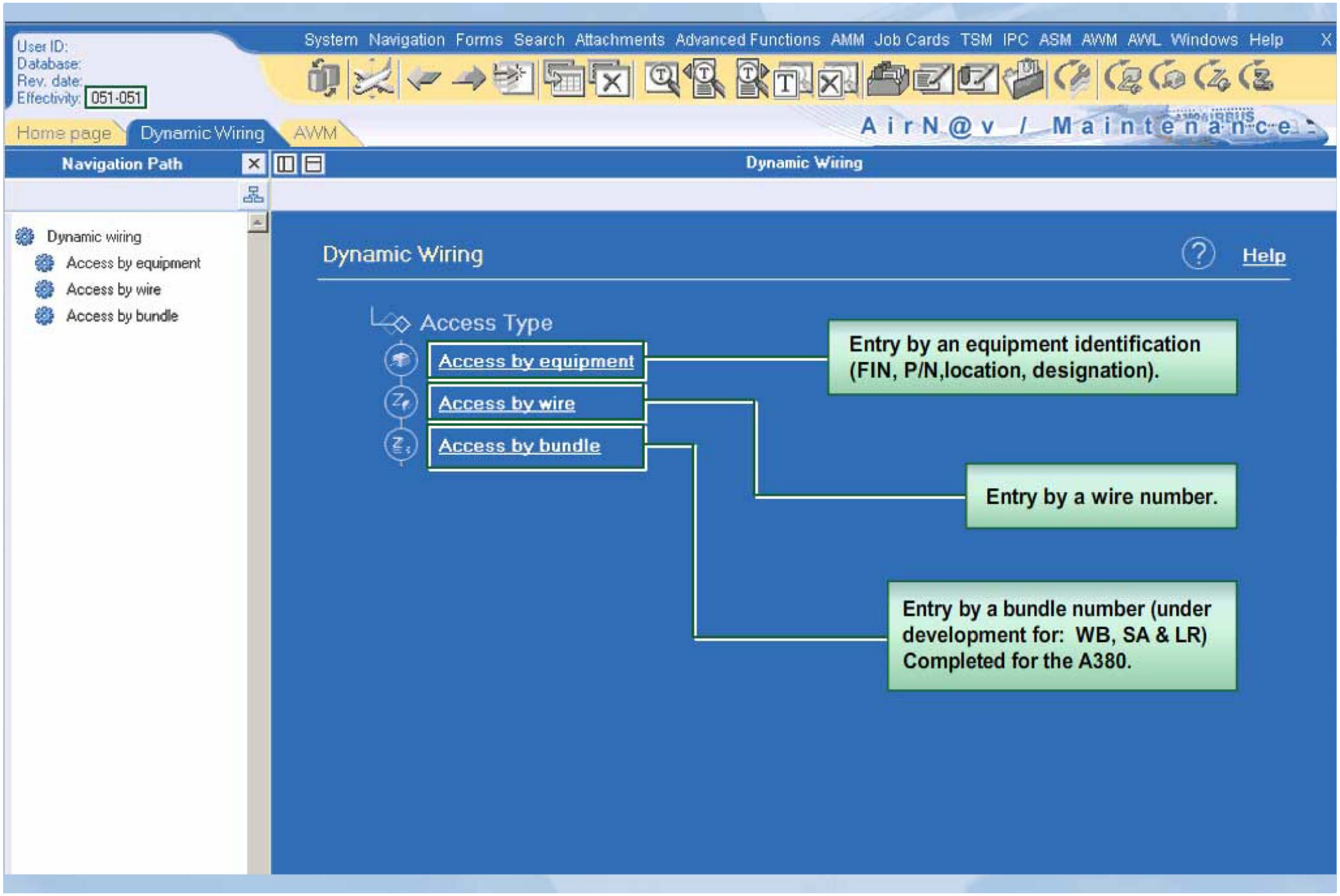
DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS TO DYNAMIC WIRING



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS TO DYNAMIC WIRING



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS TO DYNAMIC WIRING



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS TO DYNAMIC WIRING

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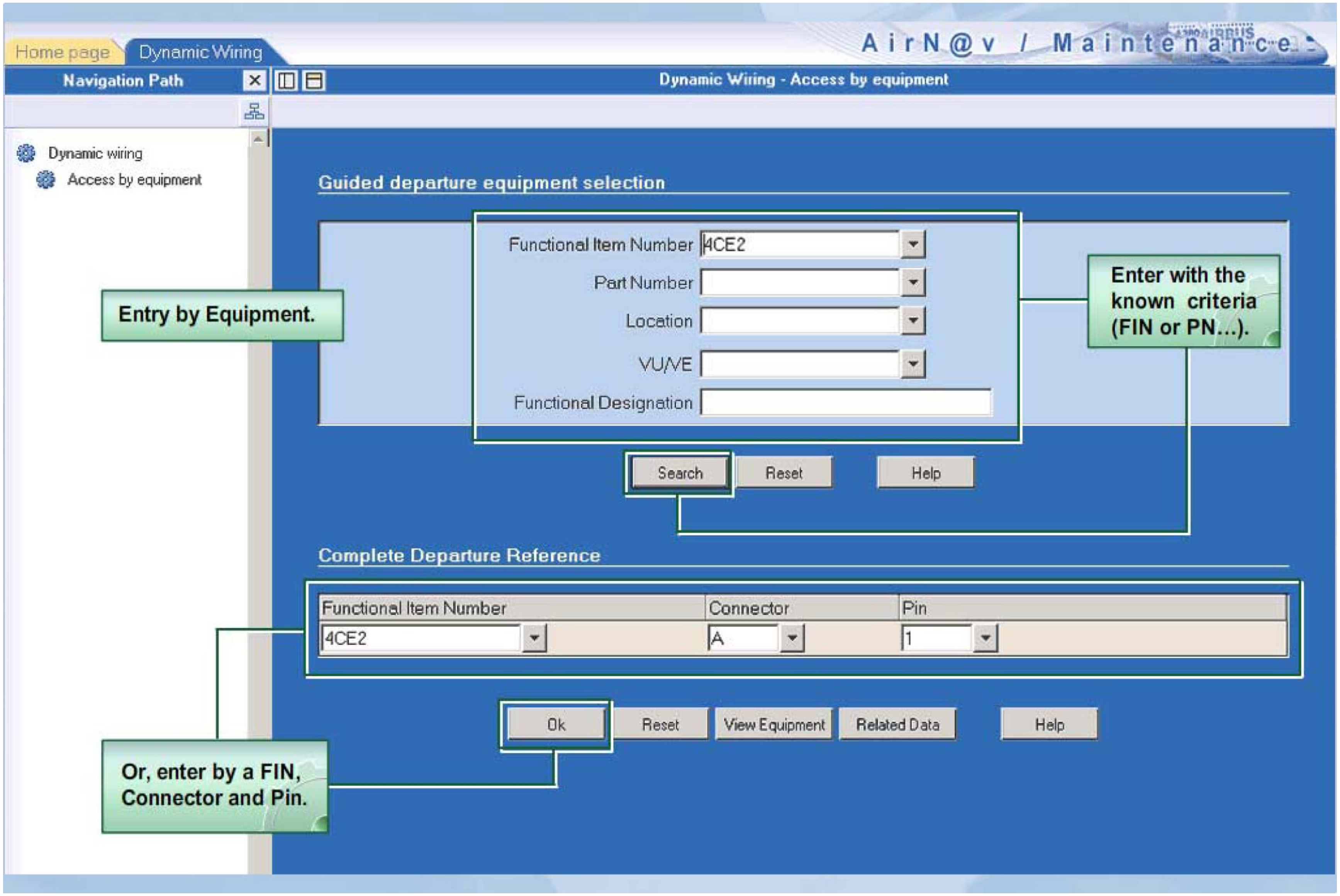
WIRING DIAGRAM MANUAL (WDM)

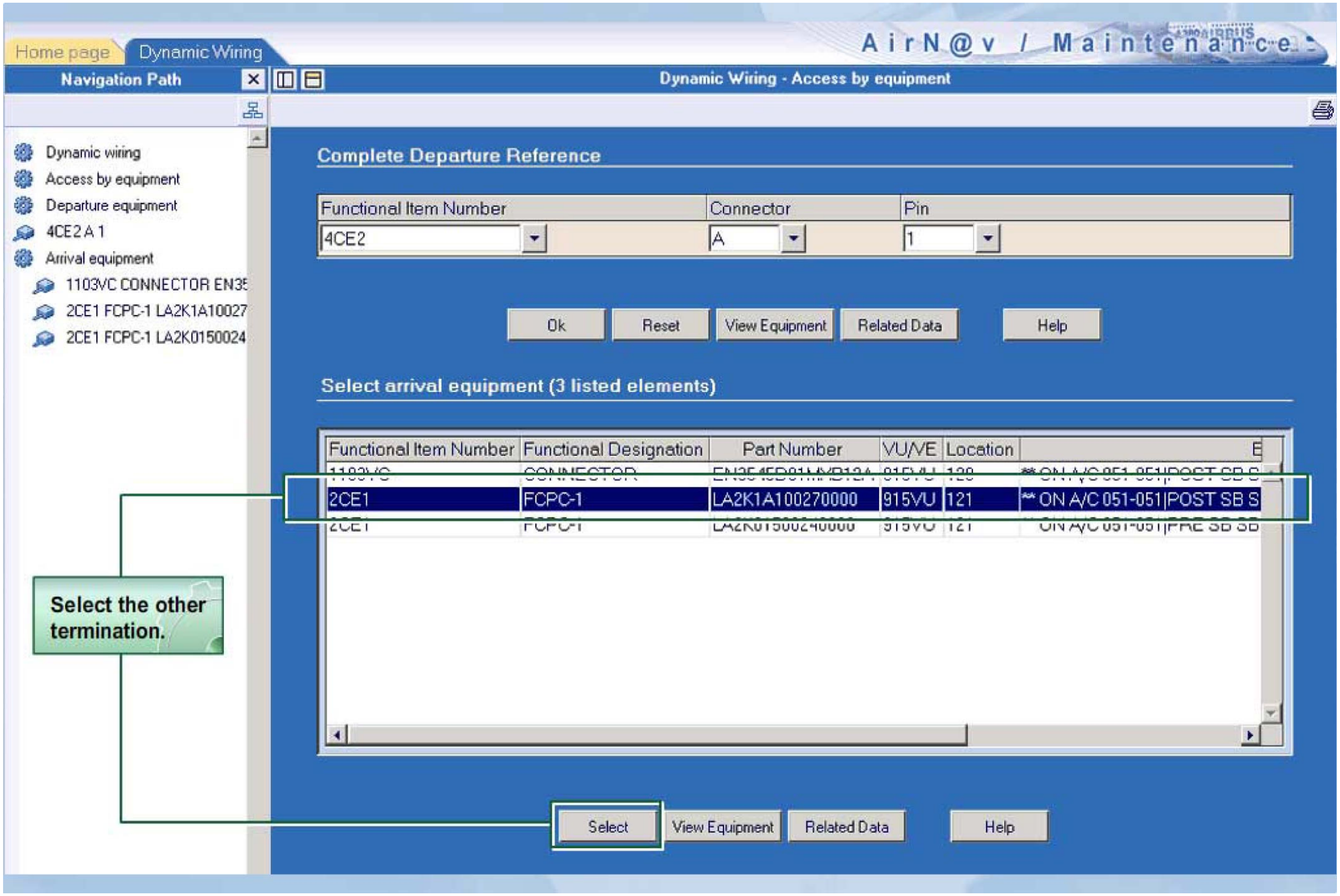
DYNAMIC WIRING IN AIRN@V MAINTENANCE (continued)

Access by Equipment



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY EQUIPMENT

X8U08481 - X0332T0 - XM2011000000001



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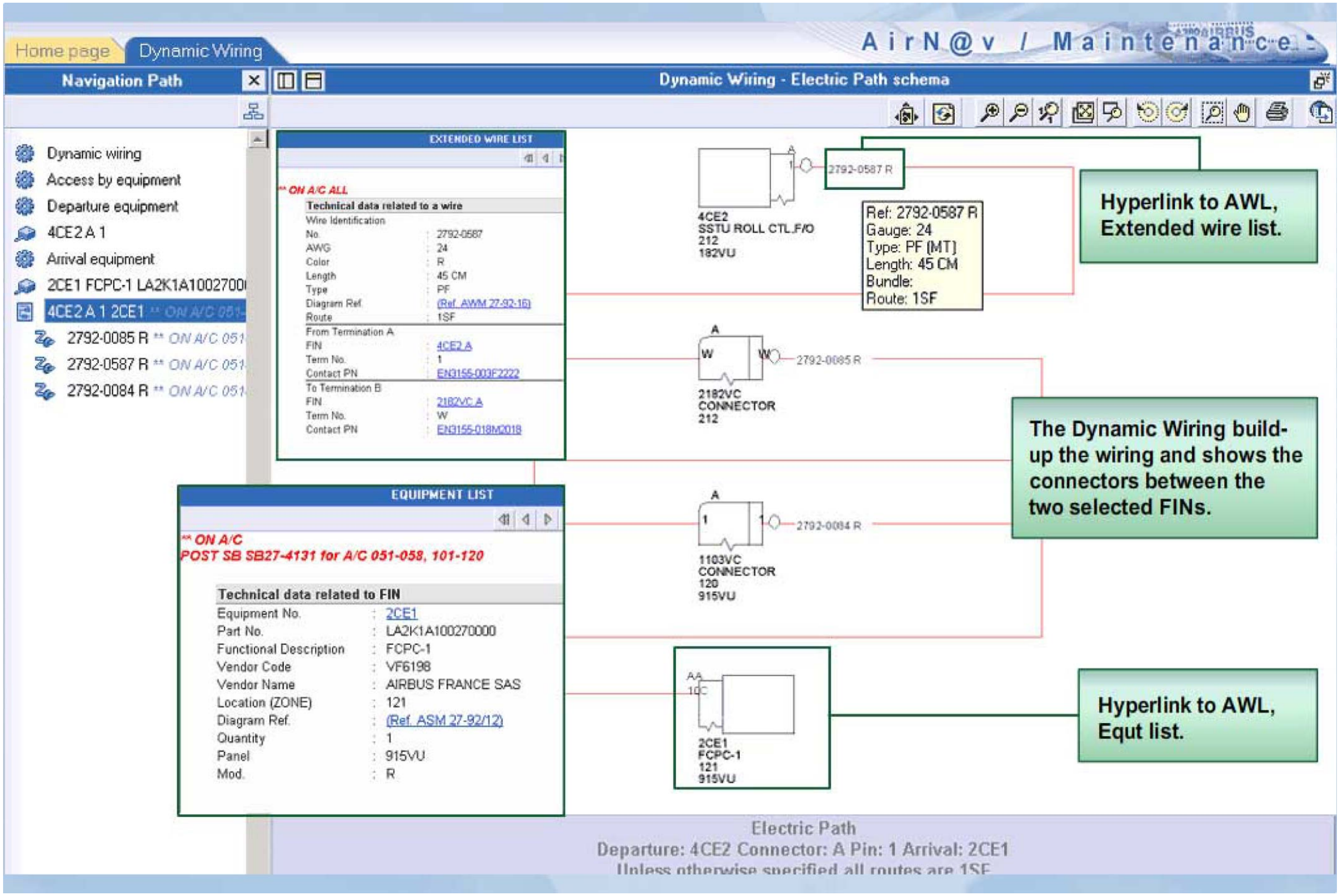
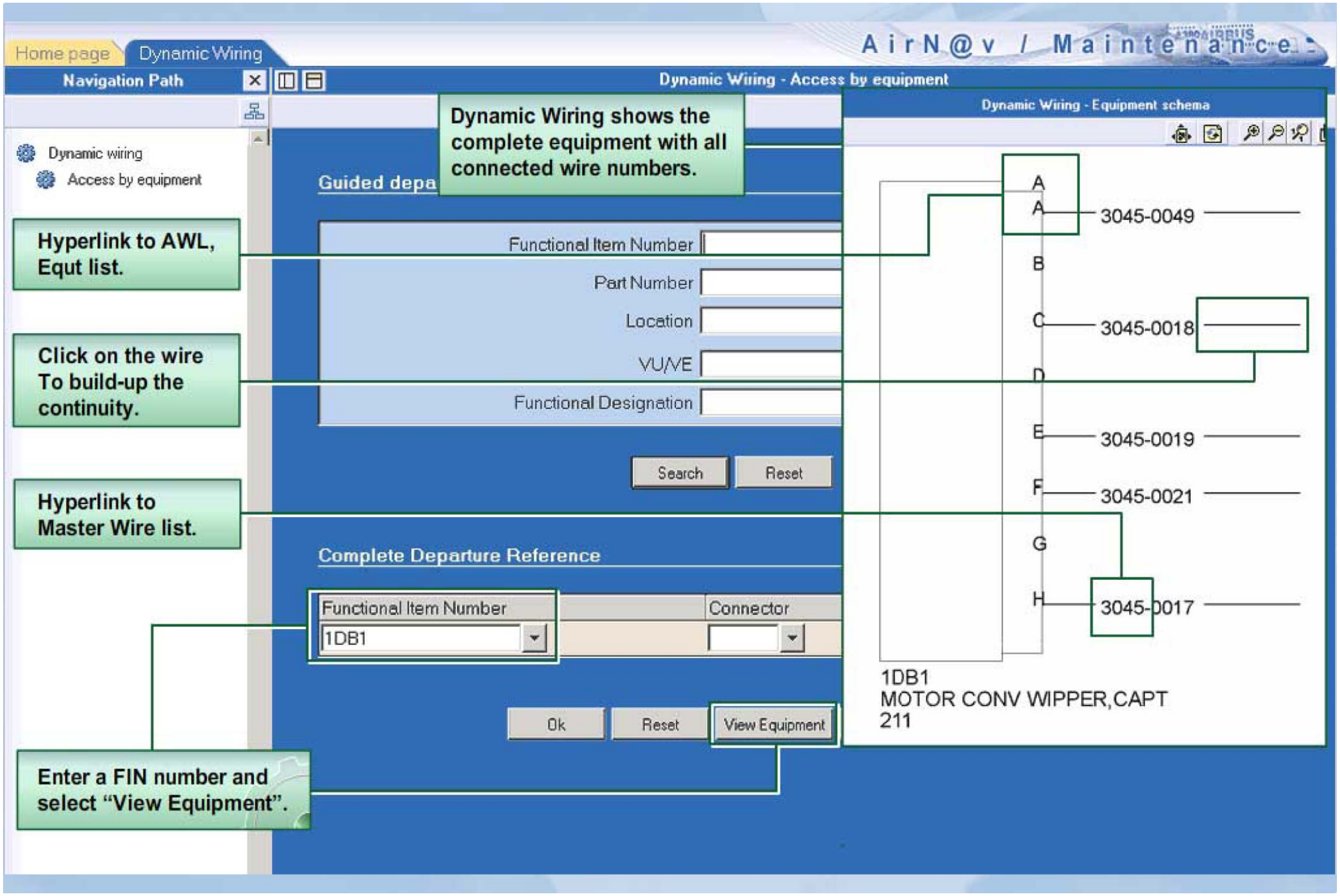
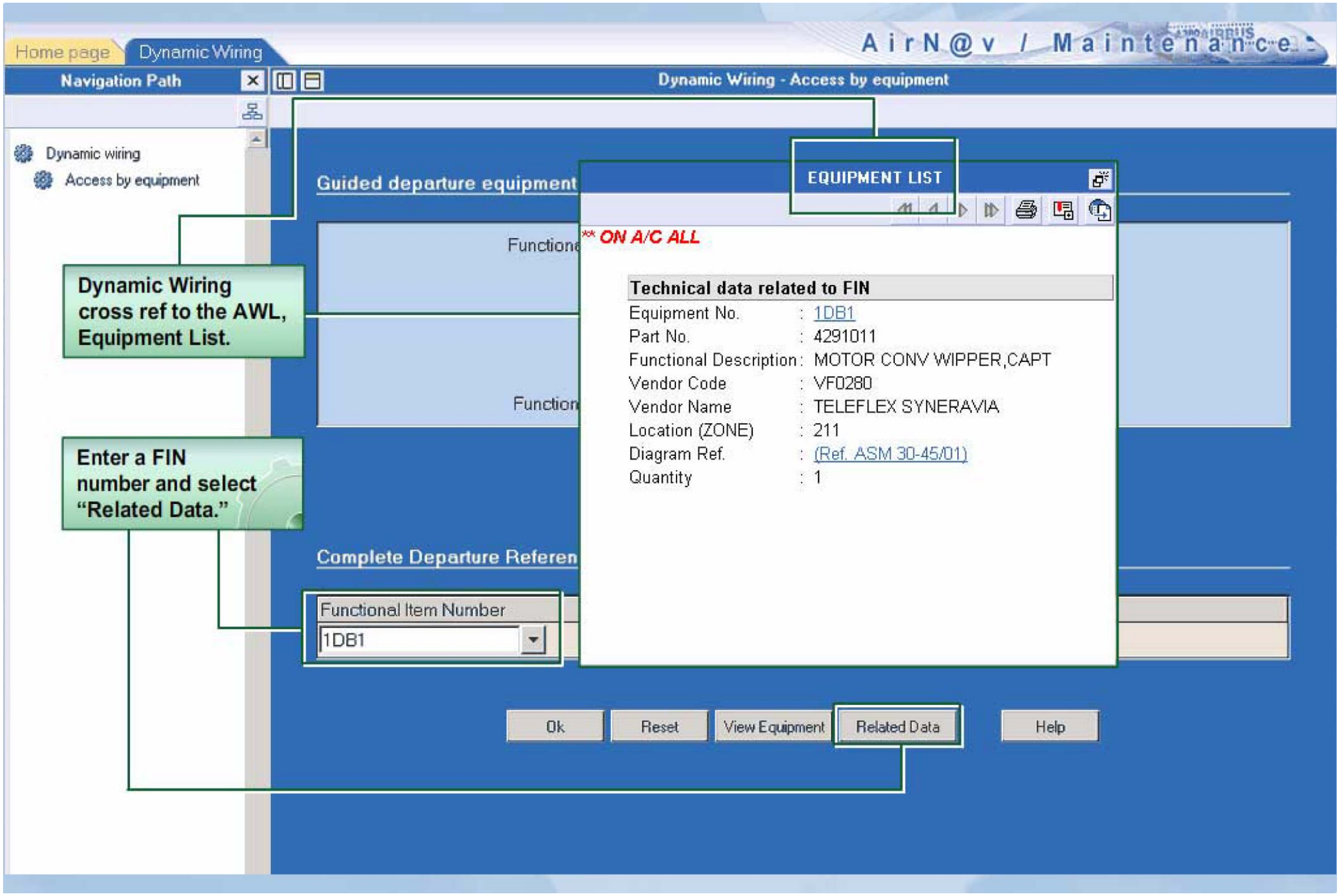


DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY EQUIPMENT



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY EQUIPMENT



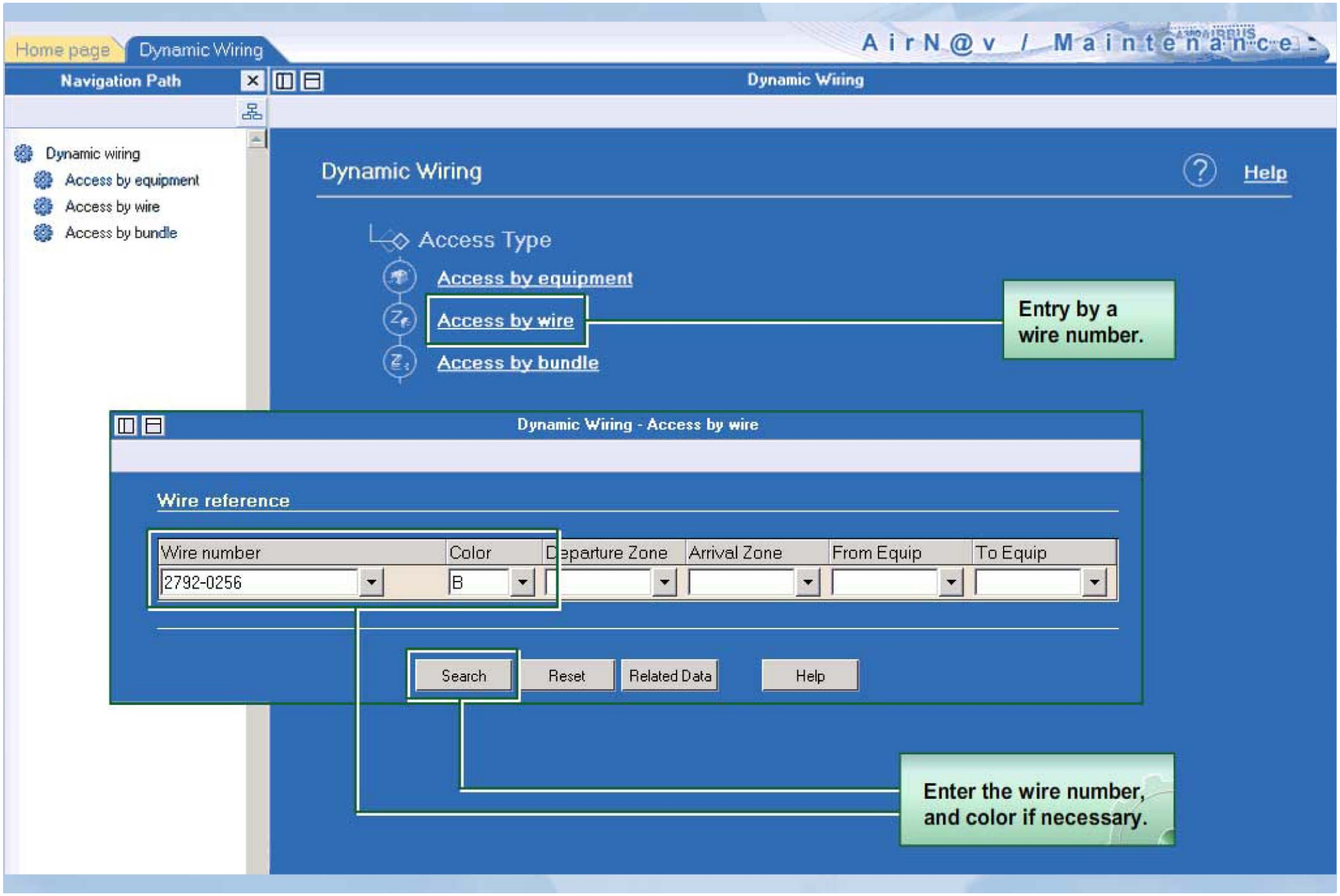
DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY EQUIPMENT

WIRING DIAGRAM MANUAL (WDM)

DYNAMIC WIRING IN AIRN@V MAINTENANCE (continued)

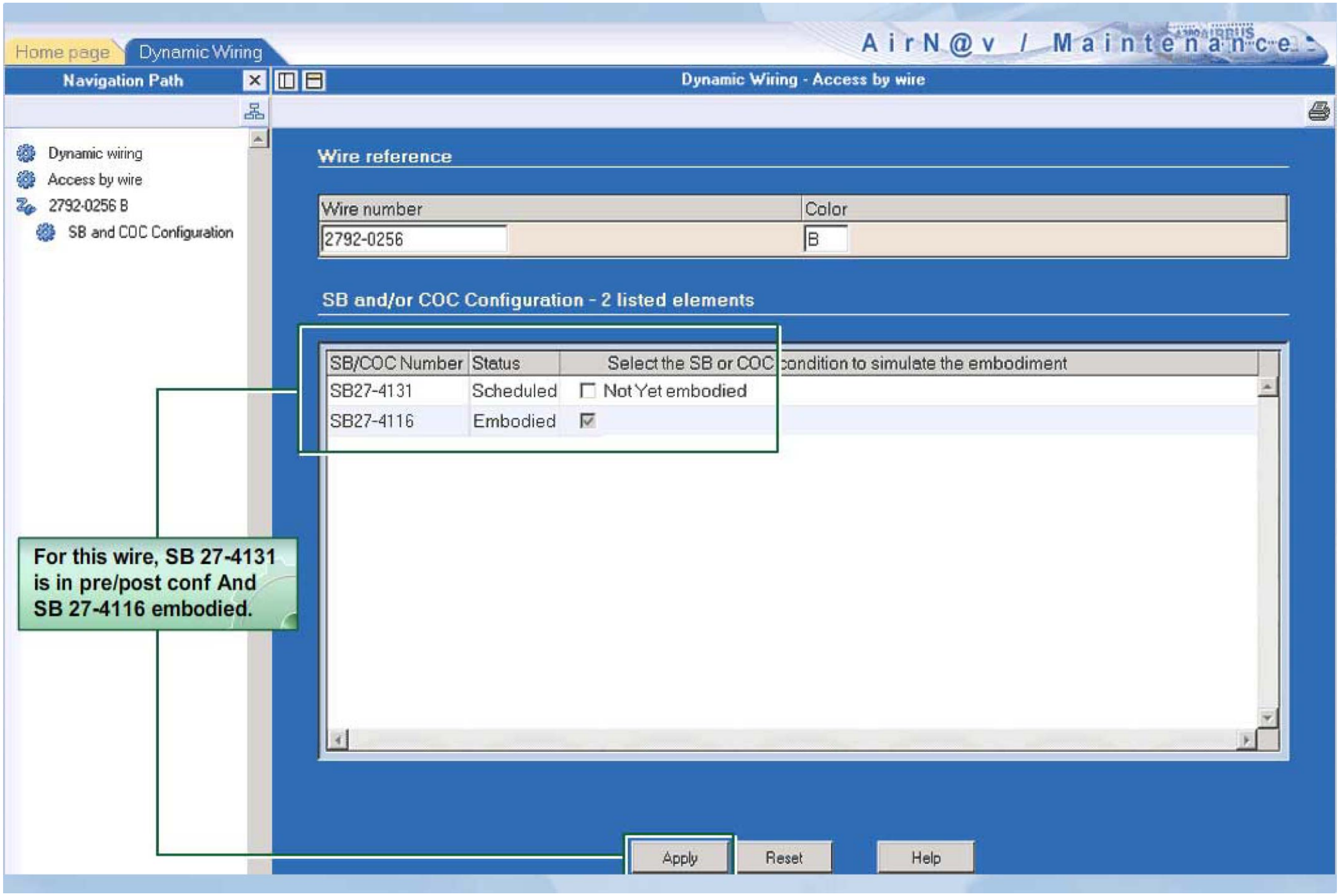
Access by Wire

X8U08481 - X0332T0 - XM2011000000001



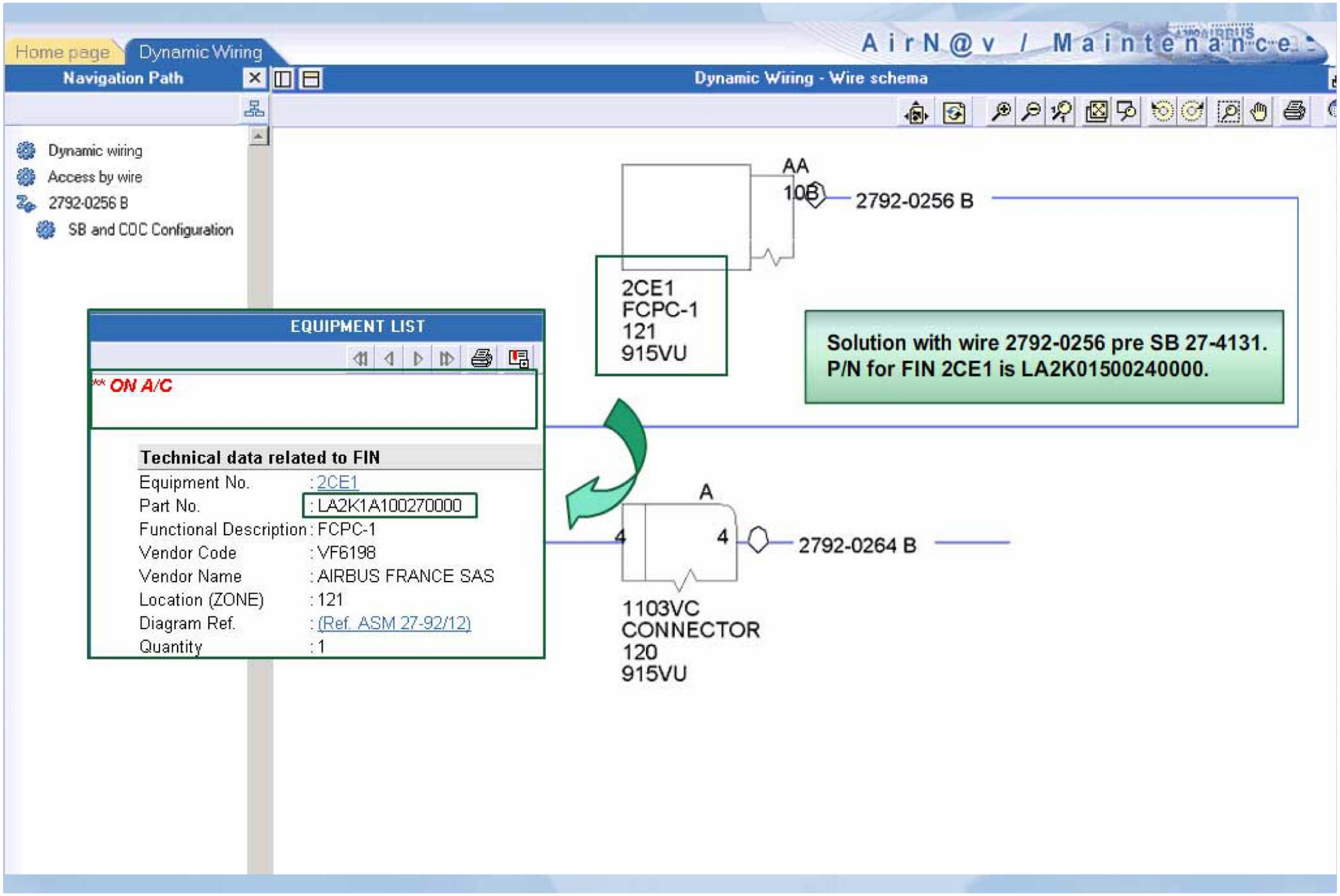
DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY WIRE

X8U08481 - X0332T0 - XM2011000000001

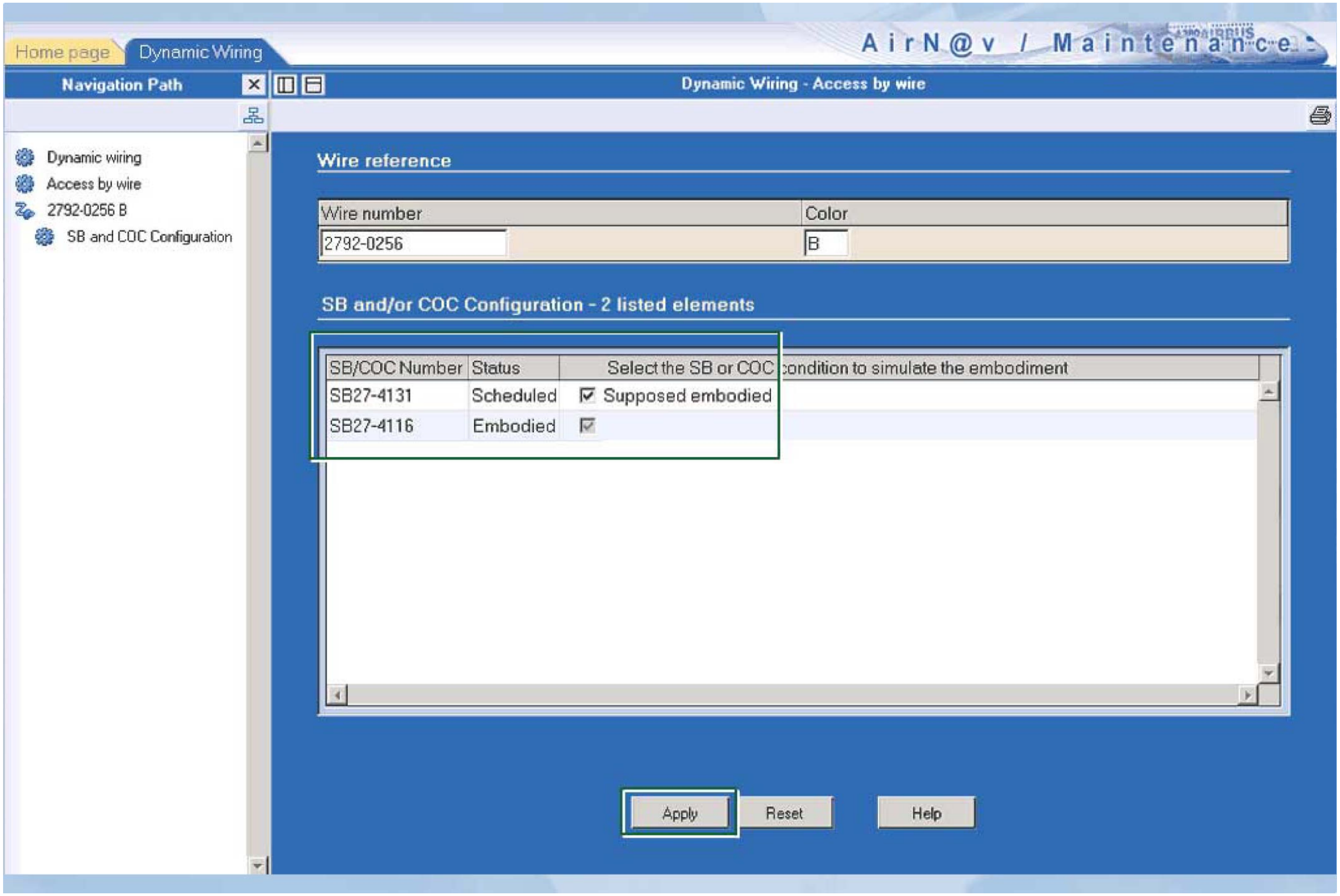


DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY WIRE

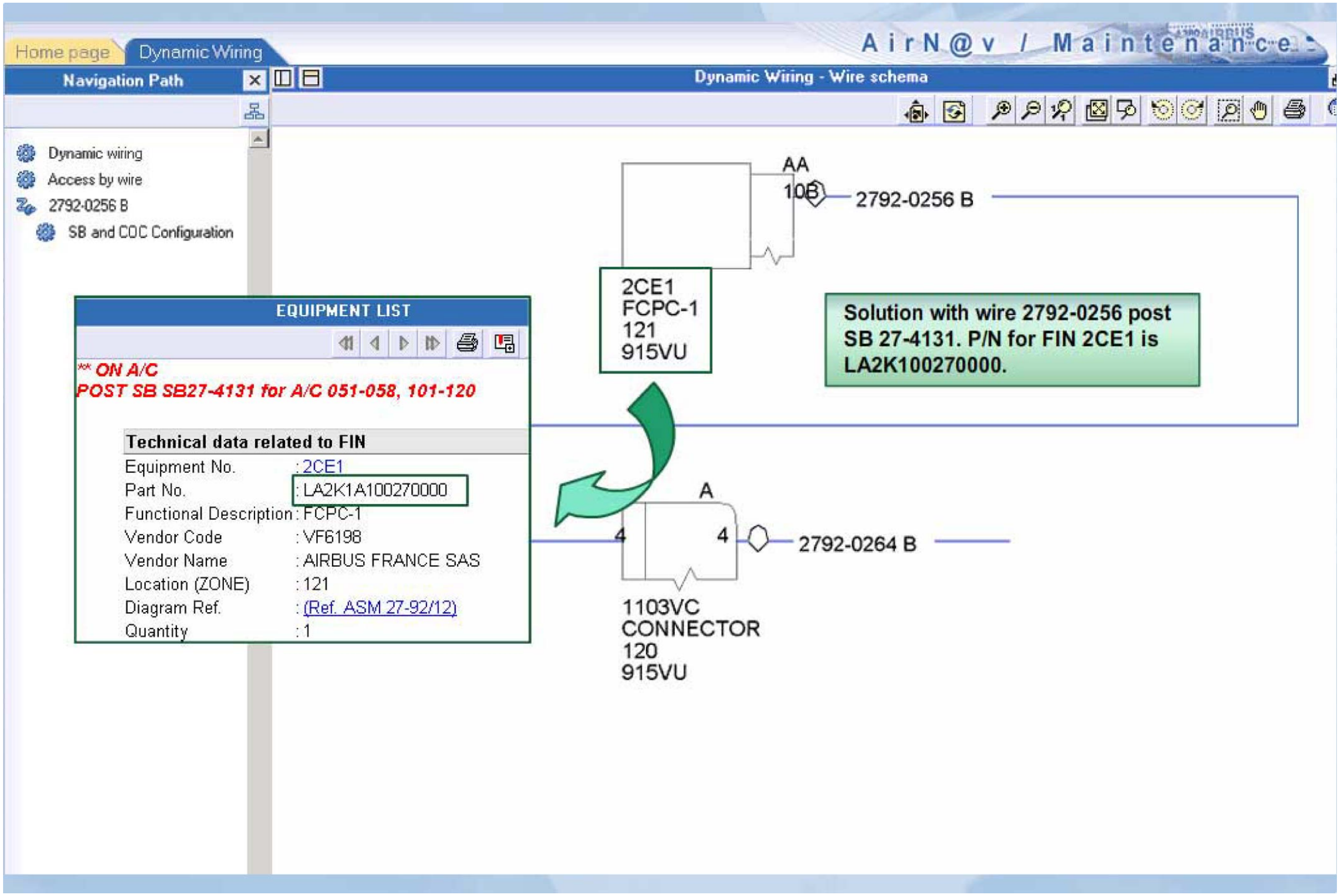
X8U08481 - X0332T0 - XM2011000000001



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY WIRE



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY WIRE

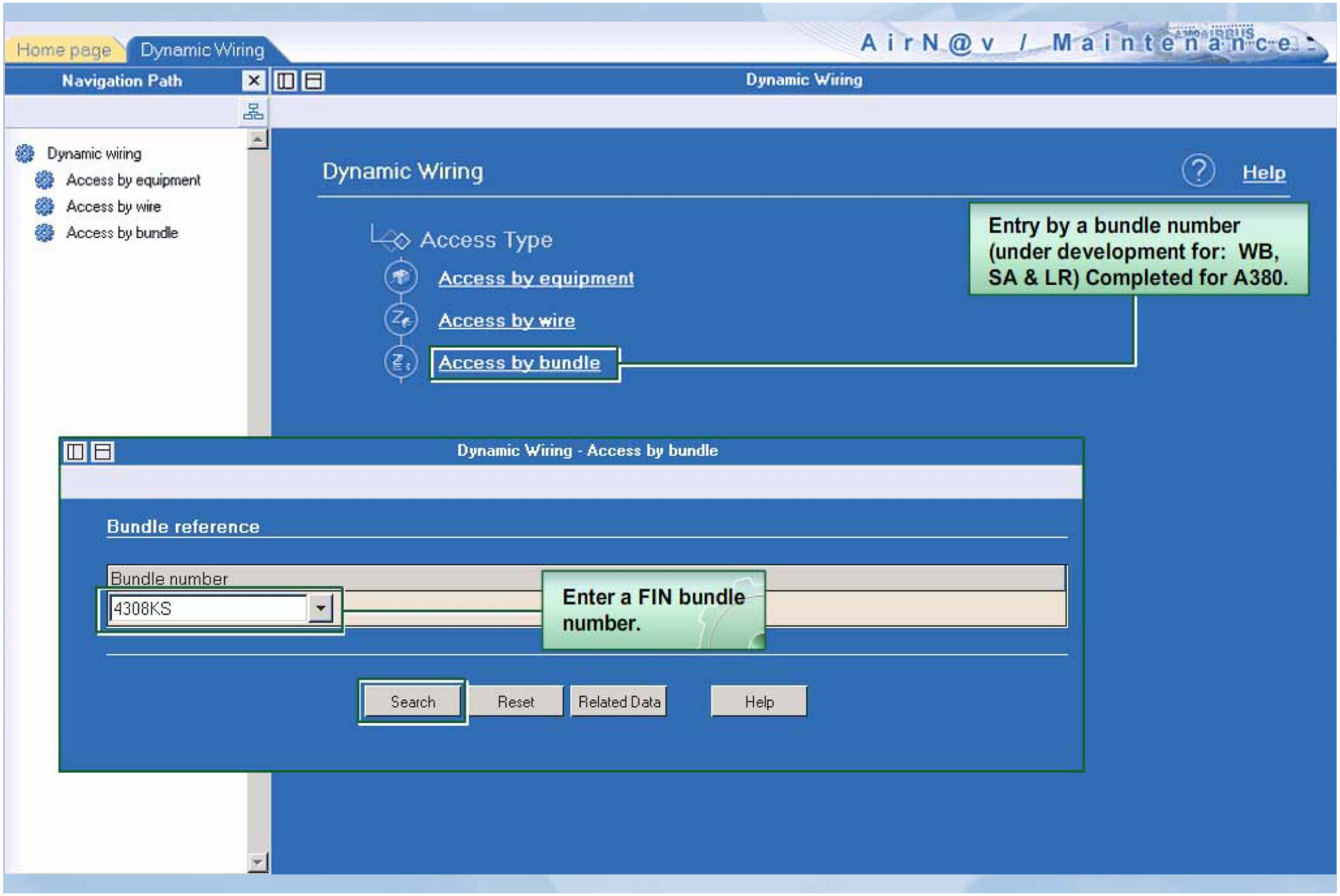


DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY WIRE

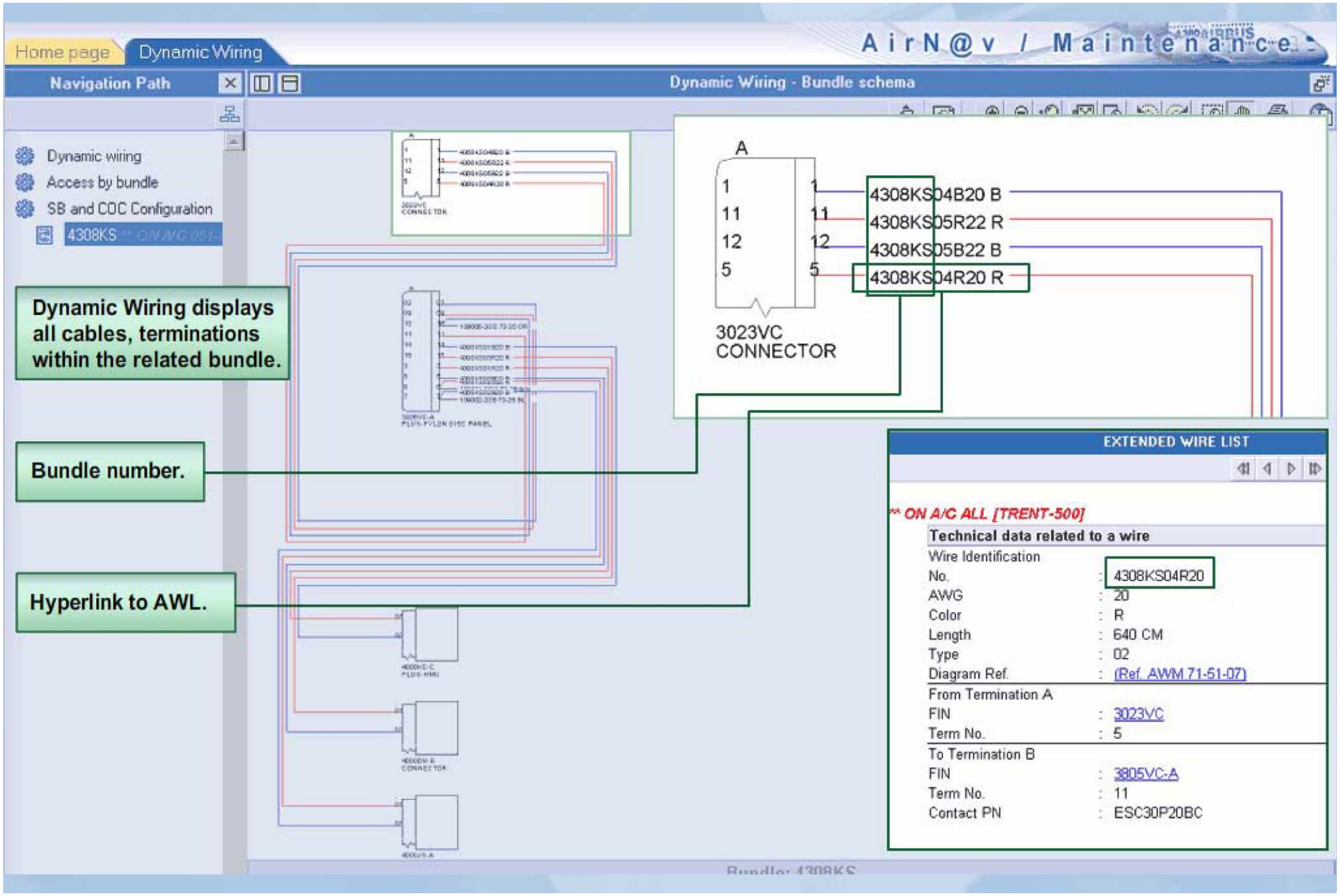
WIRING DIAGRAM MANUAL (WDM)

DYNAMIC WIRING IN AIRN@V MAINTENANCE (continued)

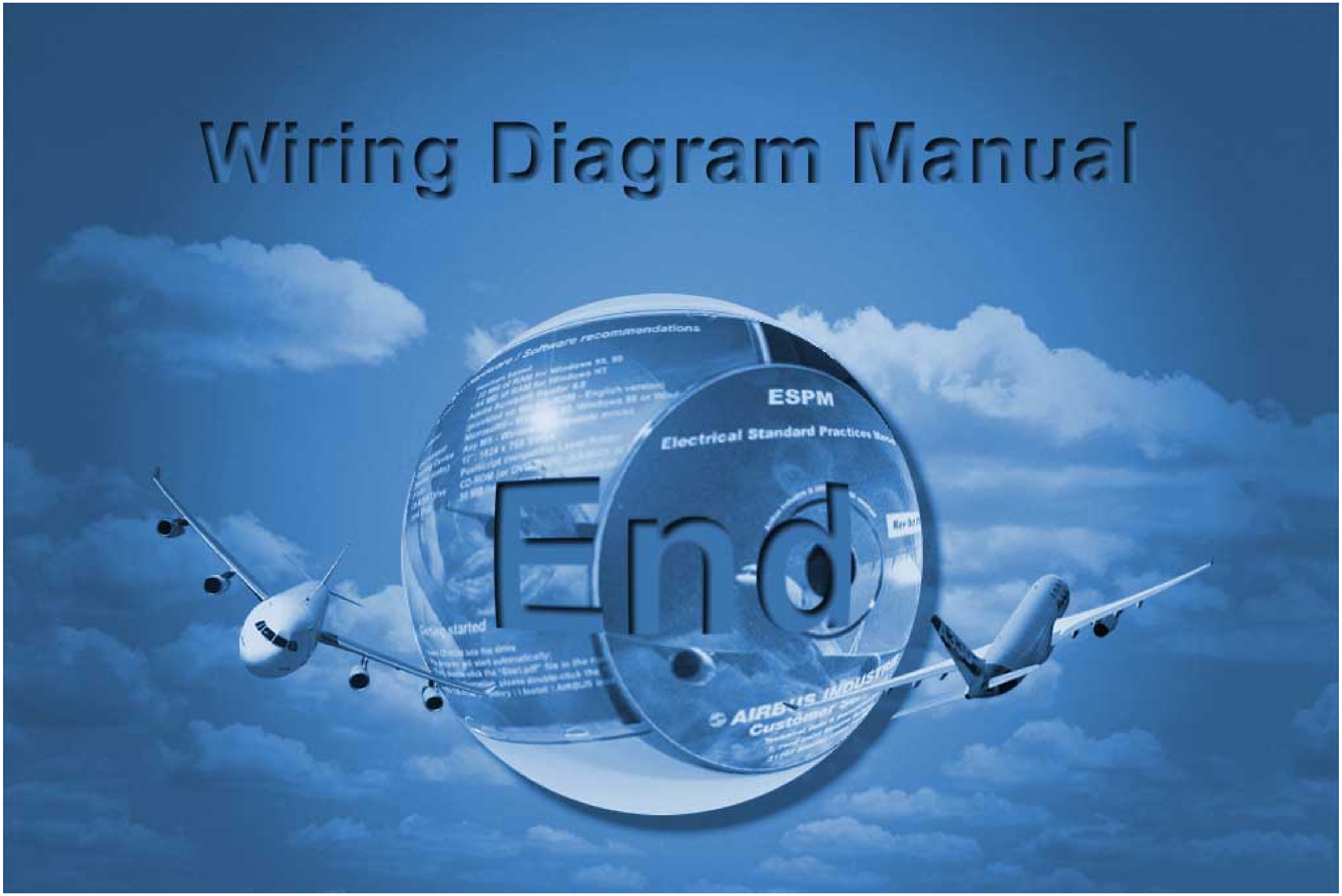
Access by Bundle (harness)



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY BUNDLE (HARNESS)



DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY BUNDLE (HARNESS)

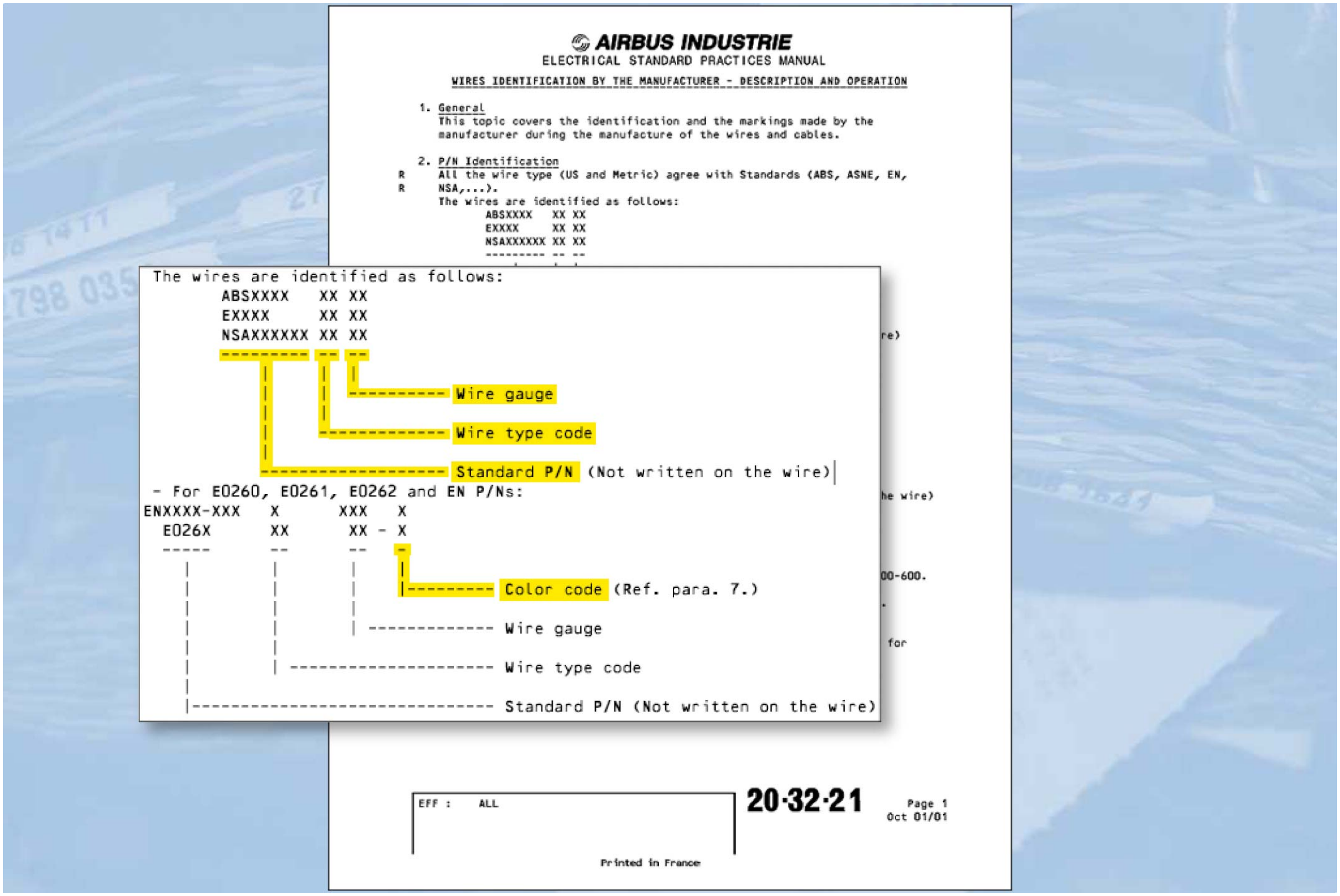


DYNAMIC WIRING IN AIRN@V MAINTENANCE - ACCESS BY BUNDLE (HARNESS)

WIRE IDENTIFICATION

IDENTIFICATION TYPE AND CONSTRUCTION

This module covers the wire identification used by the wire manufacturers. All the wire types (US and metric) installed on Airbus aircraft agree with standard specifications (NSA, ASNE, ABS, EN,...)
Wires are identified as follows.
- standard part number
- wire type code
- wire gauge
- color code



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

WIRES IDENTIFICATION BY THE MANUFACTURER - DESCRIPTION AND OPERATION

1. General
This topic covers the identification and the markings made by the manufacturer during the manufacture of the wires and cables.

2. P/N Identification
R All the wire type (US and Metric) agree with Standards (ABS, ASNE, EN,
R NSA,...).
The wires are identified as follows:

```
The wires are identified as follows:
       ABSXXXX    XX XX
       EXXXX      XX XX
       NSAXXXXXX  XX XX
       ---------  -- --
           |      |  |
           |      |  |---------- Wire gauge
           |      |
           |      |------------- Wire type code
           |
           |------------------- Standard P/N (Not written on the wire)
 - For E0260, E0261, E0262 and EN P/Ns:
ENXXXX-XXX    X      XXX   X
  E026X       XX      XX - X
  -----       --      --   -
    |         |       |    |
    |         |       |    |--------- Color code (Ref. para. 7.)
    |         |       |
    |         |       | ------------- Wire gauge
    |         |
    |         | --------------------- Wire type code
    |
    |-------------------------------- Standard P/N (Not written on the wire)
```

EFF : ALL

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IDENTIFICATION TYPE AND CONSTRUCTION

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WIRE IDENTIFICATION

WIRE TYPES

Wire types
There are two families of wire types:
- United States (US)
The United States (US) wire types are installed on A300/A310/A300-600.
Their core diameter has US diameters.
e.g. AKA gauge 24 has 19 strands (diameter 0.127mm/0.0050 in.).
- Metric (M) types :
The Metric (M) wire types are installed on the other Airbus A/C for weight saving.
e.g. CF gauge 24 has 19 strands (diameter 0.12mm/0.0047 in.).

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ELECTRICAL STANDARD PRACTICES MANUAL

WIRES IDENTIFICATION BY THE MANUFACTURER - DESCRIPTION AND OPERATION

1. General
This topic covers the identification and the markings made by the manufacturer during the manufacture of the wires and cables.

2. P/N Identification
R All the wire type (US and Metric) agree with Standards (ABS, ASNE, EN,
R NSA,...).
The wires are identified as follows:

```
        ABSXXXX   XX XX
        EXXXX     XX XX
        NSAXXXXXX XX XX
        --------- -- --
            |      |  |
            |      |  ---------- Wire gauge
            |      |
            |      ------------- Wire type code
            |
            -------------------- Standard P/N (Not written on the wire)
R    - For E0260, E0261, E0262 and EN P/Ns:
R   ENXXXX-XXX   X      XXX   X
R     E026X      XX      XX - X
R     -----      --      --   -
R       |        |       |    |
R       |        |       |    |--------- Color code (Ref. para. 7.)
R       |        |       |
R       |        |       | ------------- Wire gauge
R       |        |
R       |        | --------------------- Wire type code
R       |
R       |------------------------------- Standard P/N (Not written on the wire)
```

3. Wire Types
There are two families of wire types:

A. United States (US)
The United States (US) wire types are installed on A300/A310/A300-600.
Their core diameter has US diameters.
e.g. AKA gauge 24 has 19 strands diameter 0.127 mm (0.0050 in.).

B. Metric (M) types:
The Metric (M) wire types are installed on the other Airbus A/C for weight saving.
e.g. CF gauge 24 has 19 strands diameter 0.12 mm (0.0047 in.).

EFF : ALL

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WIRE TYPES

X8U08481 - X0332T0 - XM2023000000001

WIRE IDENTIFICATION

WIRE TYPE EQUIVALENCE TABLE

Wire type equivalence table
US ->Metric -one way equivalence tables
If it is necessary to replace a US wire type on aircraft and if the US wire type is not available, you can use an equivalent Metric wire (See one way equivalence tables (US->Metric).

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ELECTRICAL STANDARD PRACTICES MANUAL

C. Wire type equivalence table

R (1) US -> Metric - one way equivalence tables
R If it is necessary to replace a US type wire on the aircraft and if
R the US type wire is no longer available, you can use an equivalent

(a) Single wires

US	M
AKA	CF
AKB	CF
BE	BF
DE	DK

(b) Twisted wires

TWO WIRES		THREE WIRES		FOUR WIRES	
US	M	US	M	US	M
PD	PF	QD	QF	RD	RF
PE	PG	QE	QG	RE	RH

(c) Shielded wires

SINGLE WIRE		TWO WIRES		THREE WIRES		MULTI WIRES	
US	M	US	M	US	M	US	M
SE	ST	TG	TT	UG	UE	YE	HA (5 Wires)
SF	SJ	TJ	TK	UK	UD	YD	YF (6 Wires)
SFA	SJ	TJA	TK	UKA	UD	YN	HB (5 Wires)
SFB	SJ	TJB	TK	UKB	UD	YR	YZ (10 Wires)
SG	SW					YP	HC (11 Wires)

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WIRE TYPE EQUIVALENCE TABLE

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WIRE IDENTIFICATION

WIRE TYPE CODES

Wire Type Codes
These Tables give the list of wire type codes
with the related standard P/Ns
(US and Metric wire type families).

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TABLE 1-A

Single-Wire Identification Coding T < 200°C (392°F)
Normal Use - Unshielded

CODE	TYPE	INSULATOR	SPECIFICATION	STANDARD P/N
AKA	600V-200°C (392°F)	KAPTON/PTFE		NSA935012
AKB	600V-200°C (392°F)	KAPTON/FEP	SNIAS 451242/78	NSA935012

TABLE 1-B

Single Wire Identification Coding T < 200°C (392°F)
Panel Wiring

CODE	TYPE	INSULATOR	SPECIFICATION	STANDARD P/N
BE	600V-200°C (392°F)	PTFE	MIL-W-16878	NSA935041
BF	600V-200°C (392°F)	PTFE		E0260

TABLE 1-C

Single Wire Identification Coding T = 200°C (392°F)
Normal Use - Unshielded

CODE	TYPE	INSULATOR	SPECIFICATION	STANDARD P/N
CF	600V-200°C (392°F)	KAPTON/FEP		E0261 or
				EN2266-003A
	CF-C	FEP or PTFE		EN2266-004A
	CF-U	FEP or PTFE		EN2266-005A
	CF-Y	FEP or PTFE		EN2266-006A

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WIRE TYPE CODES

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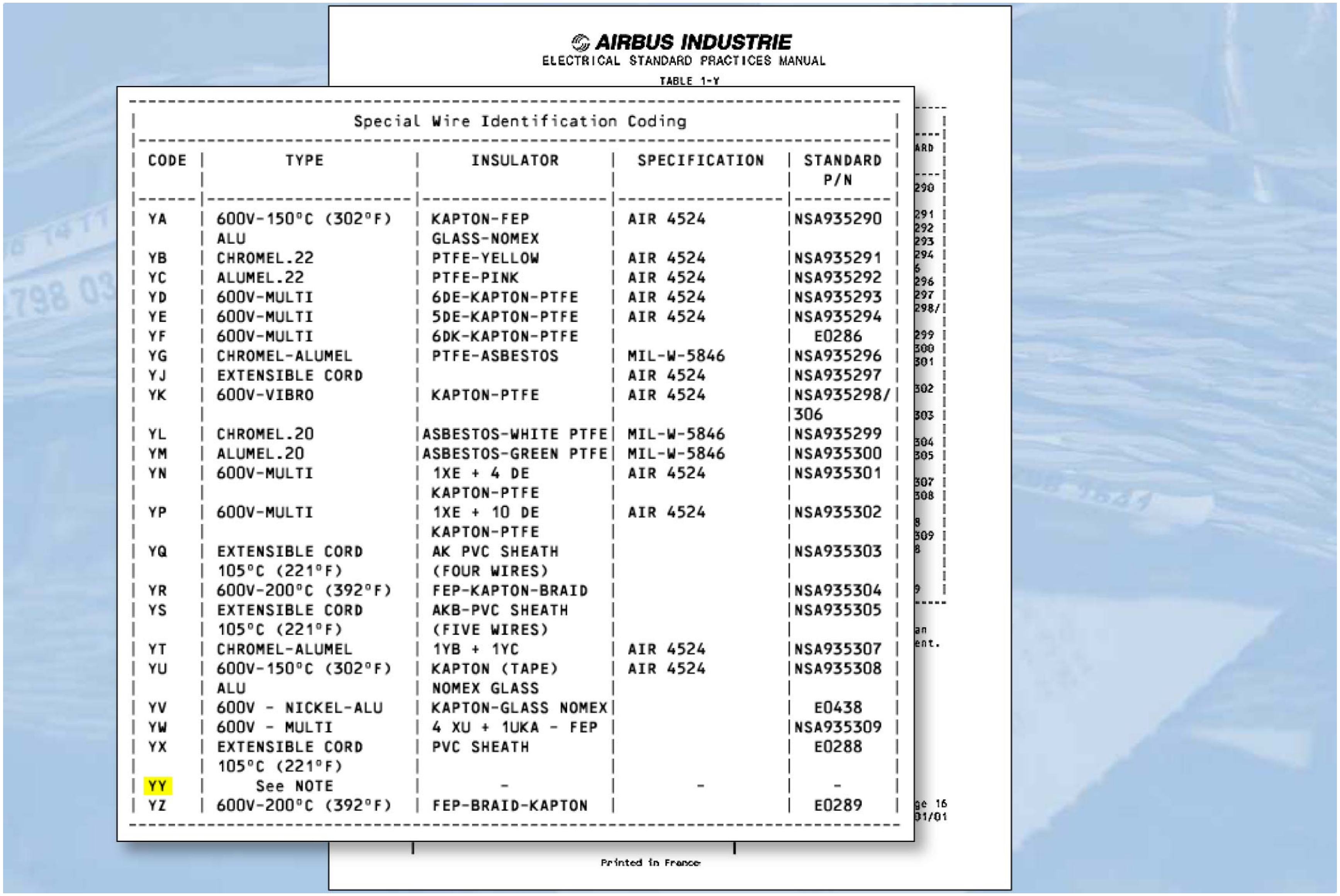
WIRE IDENTIFICATION

SPECIAL WIRE IDENTIFICATION CODING

YY is the AWM/AWL code of a wire used for a vendor sub-assembly of an item of equipment and whose type could be given by the CMM of the equipment.



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
TABLE 1-Y

Special Wire Identification Coding

CODE	TYPE	INSULATOR	SPECIFICATION	STANDARD P/N
YA	600V-150°C (302°F) ALU	KAPTON-FEP GLASS-NOMEX	AIR 4524	NSA935290
YB	CHROMEL.22	PTFE-YELLOW	AIR 4524	NSA935291
YC	ALUMEL.22	PTFE-PINK	AIR 4524	NSA935292
YD	600V-MULTI	6DE-KAPTON-PTFE	AIR 4524	NSA935293
YE	600V-MULTI	5DE-KAPTON-PTFE	AIR 4524	NSA935294
YF	600V-MULTI	6DK-KAPTON-PTFE		E0286
YG	CHROMEL-ALUMEL	PTFE-ASBESTOS	MIL-W-5846	NSA935296
YJ	EXTENSIBLE CORD		AIR 4524	NSA935297
YK	600V-VIBRO	KAPTON-PTFE	AIR 4524	NSA935298/306
YL	CHROMEL.20	ASBESTOS-WHITE PTFE	MIL-W-5846	NSA935299
YM	ALUMEL.20	ASBESTOS-GREEN PTFE	MIL-W-5846	NSA935300
YN	600V-MULTI	1XE + 4 DE KAPTON-PTFE	AIR 4524	NSA935301
YP	600V-MULTI	1XE + 10 DE KAPTON-PTFE	AIR 4524	NSA935302
YQ	EXTENSIBLE CORD 105°C (221°F)	AK PVC SHEATH (FOUR WIRES)		NSA935303
YR	600V-200°C (392°F)	FEP-KAPTON-BRAID		NSA935304
YS	EXTENSIBLE CORD 105°C (221°F)	AKB-PVC SHEATH (FIVE WIRES)		NSA935305
YT	CHROMEL-ALUMEL	1YB + 1YC	AIR 4524	NSA935307
YU	600V-150°C (302°F) ALU	KAPTON (TAPE) NOMEX GLASS	AIR 4524	NSA935308
YV	600V - NICKEL-ALU	KAPTON-GLASS NOMEX		E0438
YW	600V - MULTI	4 XU + 1UKA - FEP		NSA935309
YX	EXTENSIBLE CORD 105°C (221°F)	PVC SHEATH		E0288
YY	See NOTE	-	-	-
YZ	600V-200°C (392°F)	FEP-BRAID-KAPTON		E0289

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SPECIAL WIRE IDENTIFICATION CODING

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WIRE IDENTIFICATION

MANUFACTURER IDENTIFICATION

Manufacturer Identification
Identification by printing of External Sheaths.
This identification has a series of figures
printed horizontally but, because of the wire size, the printing could be vertical.
- AKA standard P/N
- CF standard P/N
- EN standard P/N

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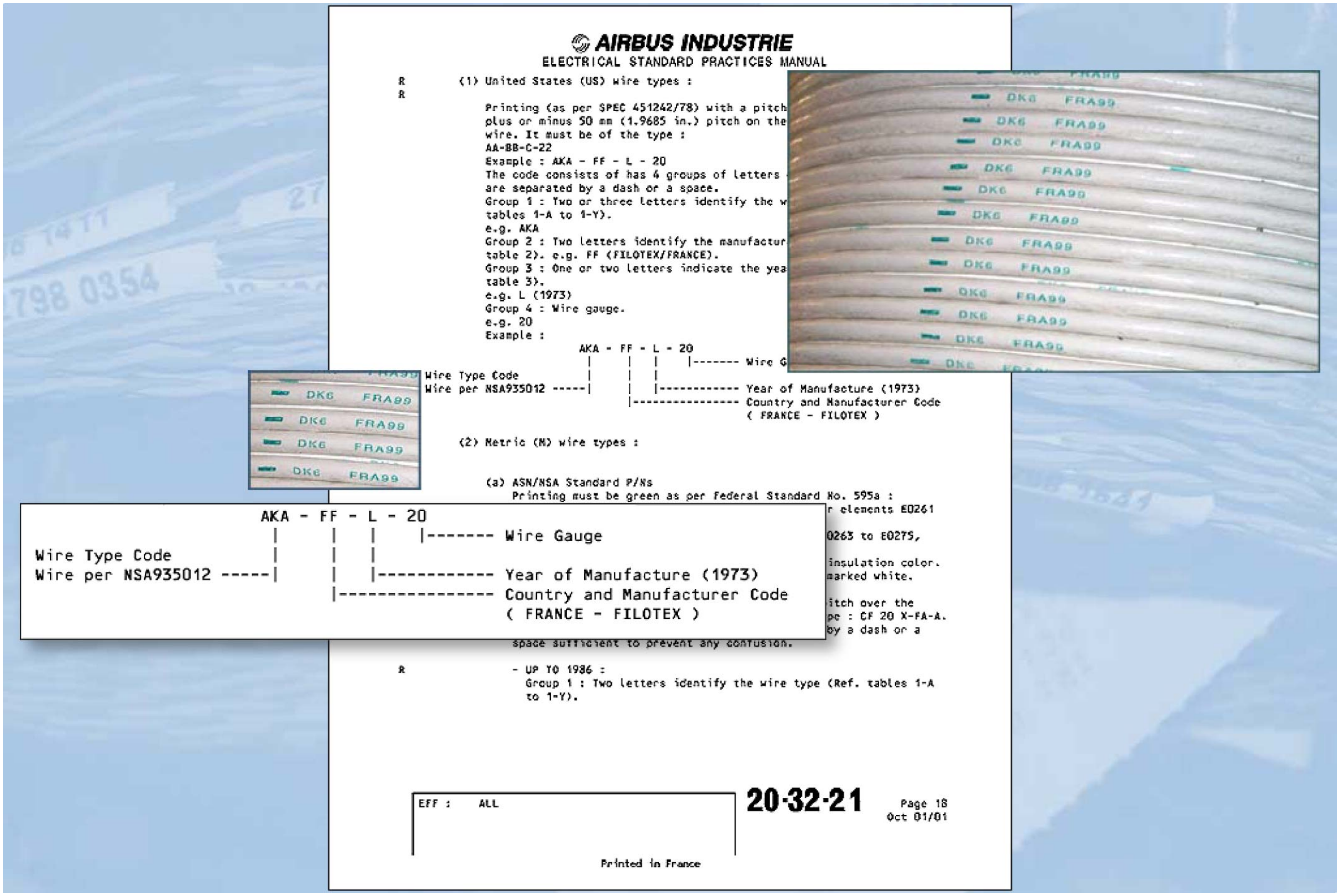

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

R (1) United States (US) wire types :
R

Printing (as per SPEC 451242/78) with a pitch
plus or minus 50 mm (1.9685 in.) pitch on the
wire. It must be of the type :
AA-BB-C-22
Example : AKA - FF - L - 20
The code consists of has 4 groups of letters
are separated by a dash or a space.
Group 1 : Two or three letters identify the w
tables 1-A to 1-Y).
e.g. AKA
Group 2 : Two letters identify the manufactur
table 2). e.g. FF (FILOTEX/FRANCE).
Group 3 : One or two letters indicate the yea
table 3).
e.g. L (1973)
Group 4 : Wire gauge.
e.g. 20
Example :

```
                        AKA - FF - L - 20
                         |     |   |    |------- Wire G
Wire Type Code           |     |   |
Wire per NSA935012 -----|     |   |------------ Year of Manufacture (1973)
                               |---------------- Country and Manufacturer Code
                                                ( FRANCE - FILOTEX )
```

(2) Metric (M) wire types :

(a) ASN/NSA Standard P/Ns
Printing must be green as per Federal Standard No. 595a :
r elements E0261
0263 to E0275,
insulation color.
marked white.
itch over the
pe : CF 20 X-FA-A.
by a dash or a
space sufficient to prevent any confusion.

R - UP TO 1986 :
Group 1 : Two letters identify the wire type (Ref. tables 1-A
to 1-Y).

EFF : ALL

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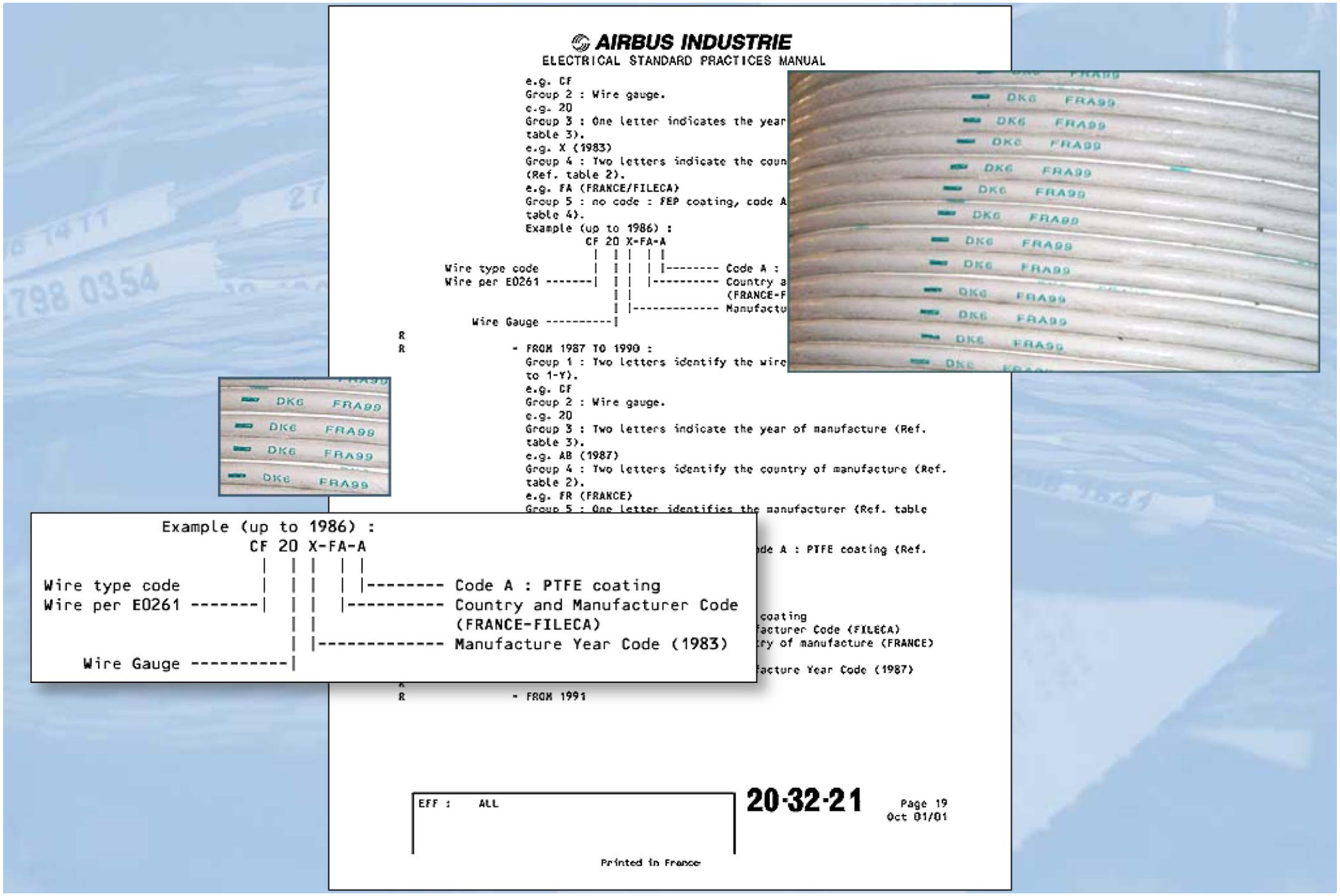
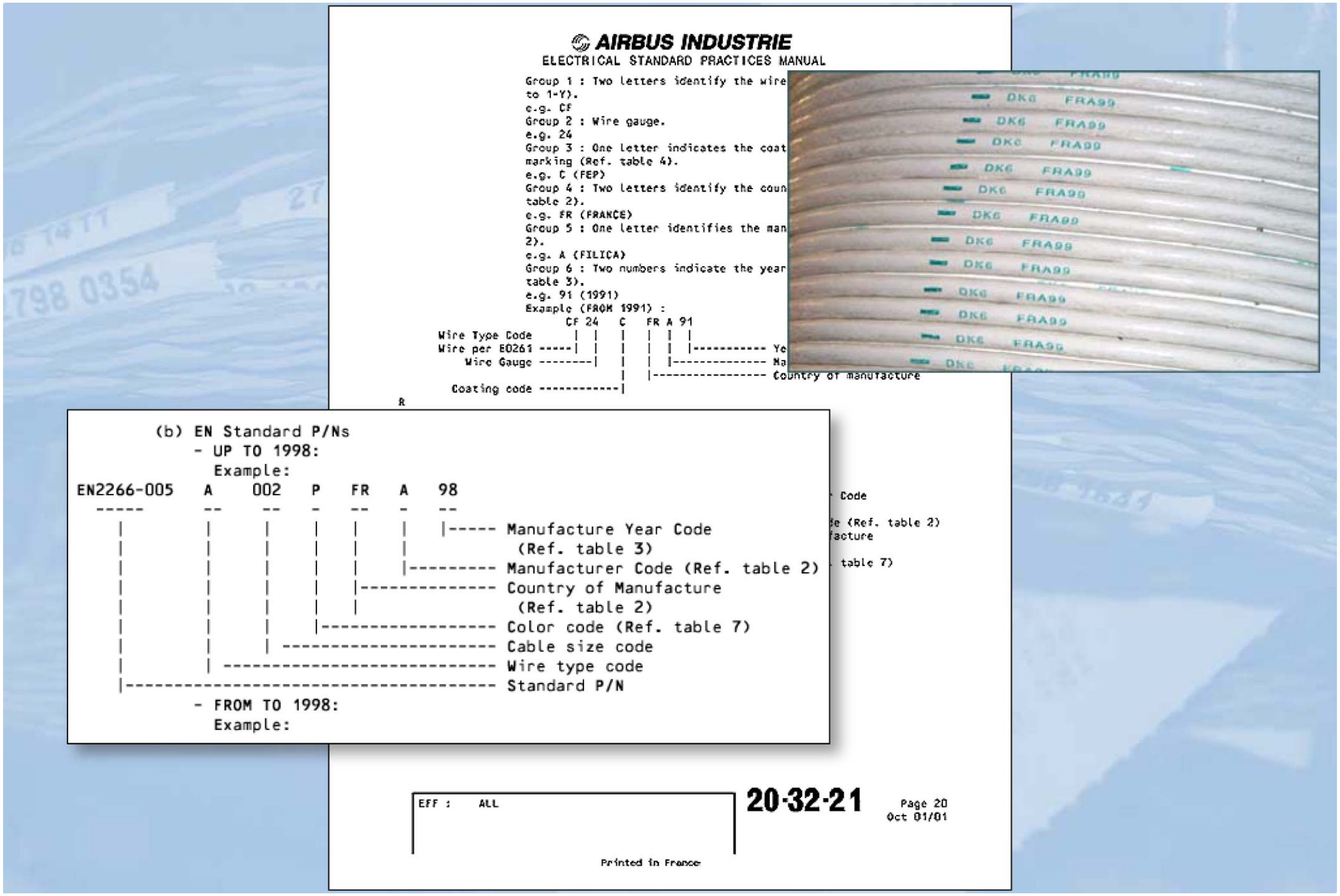
MANUFACTURER IDENTIFICATION



MANUFACTURER IDENTIFICATION



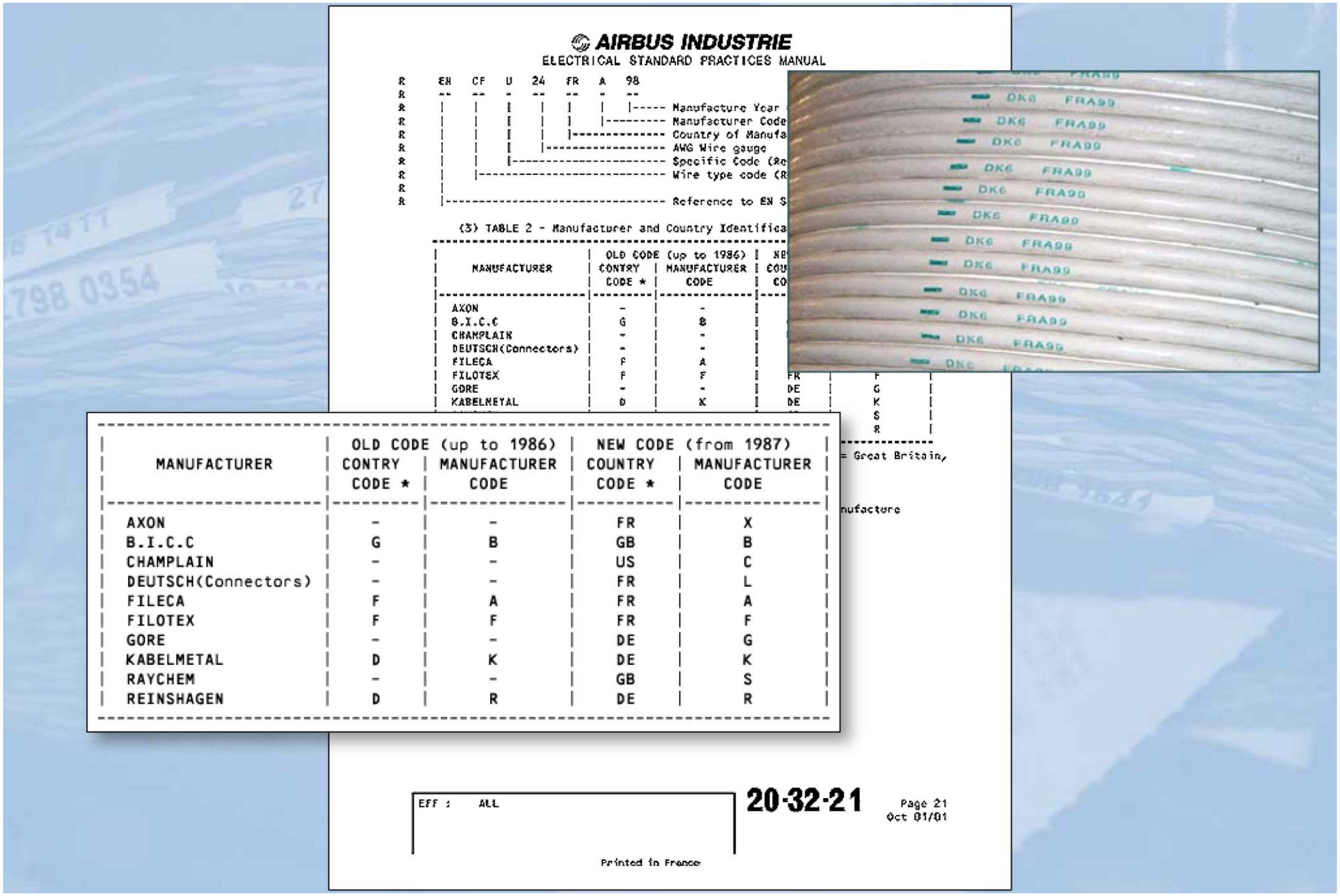
MANUFACTURER IDENTIFICATION

X8U08481 - X0332T0 - XM2023000000001

WIRE IDENTIFICATION

MANUFACTURER AND COUNTRY IDENTIFICATION CODE

Manufacturer and country identification code.



MANUFACTURER	OLD CODE (up to 1986) CONTRY CODE *	MANUFACTURER CODE	NEW CODE (from 1987) COUNTRY CODE *	MANUFACTURER CODE
AXON	-	-	FR	X
B.I.C.C	G	B	GB	B
CHAMPLAIN	-	-	US	C
DEUTSCH(Connectors)	-	-	FR	L
FILECA	F	A	FR	A
FILOTEX	F	F	FR	F
GORE	-	-	DE	G
KABELMETAL	D	K	DE	K
RAYCHEM	-	-	GB	S
REINSHAGEN	D	R	DE	R

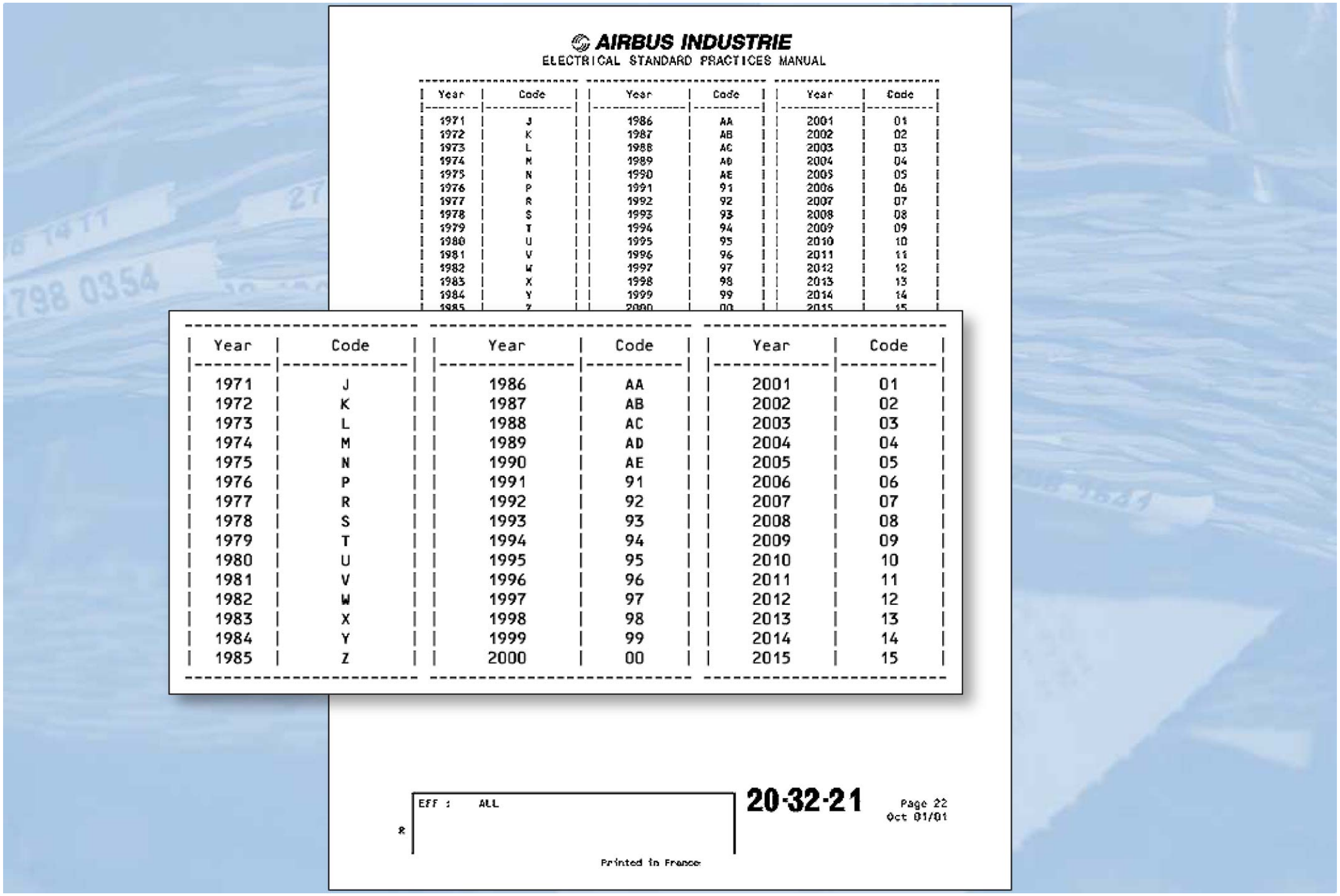
MANUFACTURER AND COUNTRY IDENTIFICATION CODE

X8U08481 - X0332T0 - XM2023000000001

WIRE IDENTIFICATION

YEAR CODING CODES

Year coding codes.



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Year	Code	Year	Code	Year	Code
1971	J	1986	AA	2001	01
1972	K	1987	AB	2002	02
1973	L	1988	AC	2003	03
1974	M	1989	AD	2004	04
1975	N	1990	AE	2005	05
1976	P	1991	91	2006	06
1977	R	1992	92	2007	07
1978	S	1993	93	2008	08
1979	T	1994	94	2009	09
1980	U	1995	95	2010	10
1981	V	1996	96	2011	11
1982	W	1997	97	2012	12
1983	X	1998	98	2013	13
1984	Y	1999	99	2014	14
1985	Z	2000	00	2015	15

R EFF : ALL

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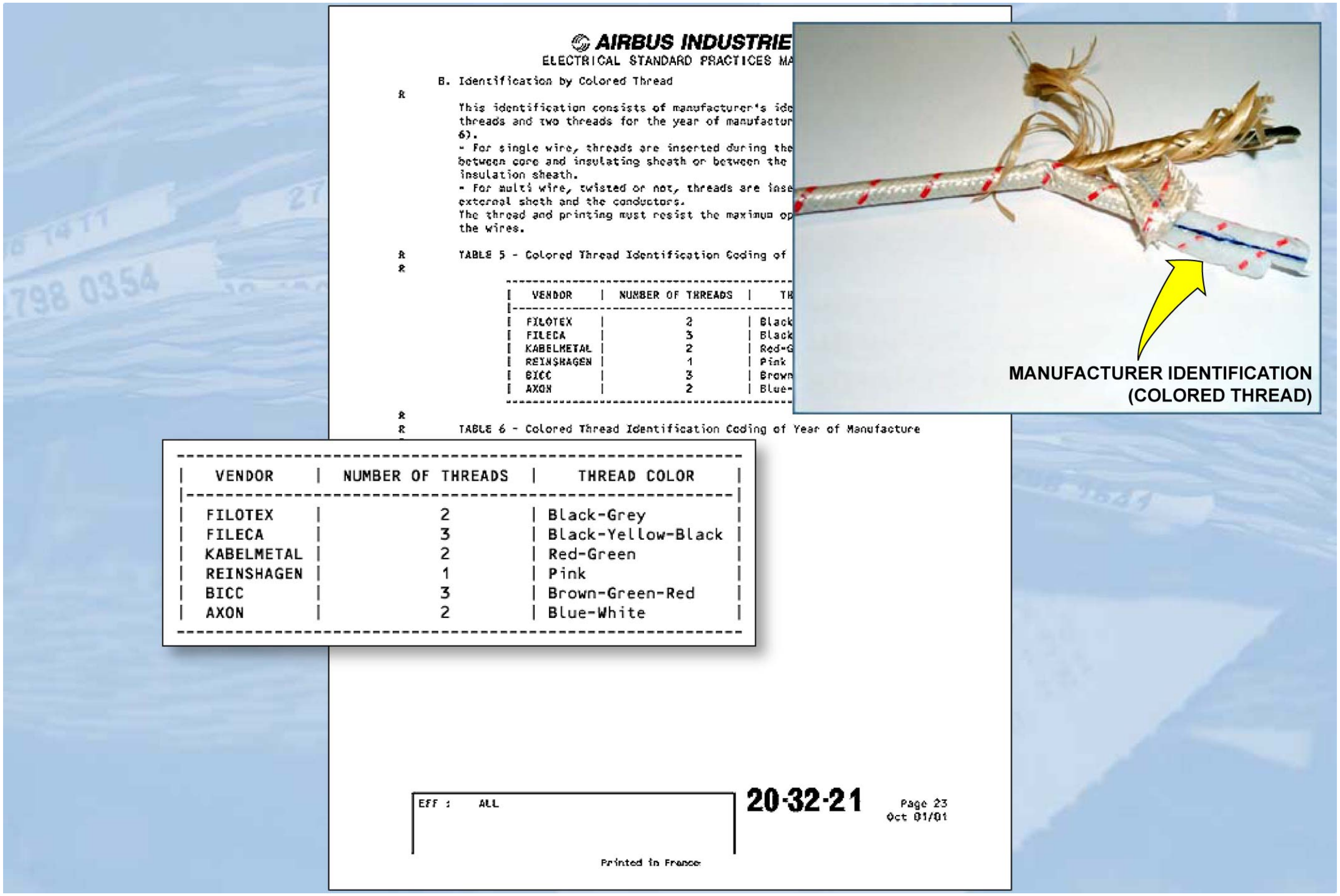
YEAR CODING CODES

X8U08481 - X0332T0 - XM2023000000001

WIRE IDENTIFICATION

IDENTIFICATION BY COLORED THREAD

Identification by colored thread
This manufacturer' s identification consists of :
- (For single wires) threads inserted during the manufacturing phase between the core and insulating sheath, or between the external sheath and insulation sheath.
- (For multi wires, twisted or not), threads inserted between the external sheath and conductors.
- Manufacturer code
- Year of manufacture



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ELECTRICAL STANDARD PRACTICES MA

B. Identification by Colored Thread

R

This identification consists of manufacturer's ide
threads and two threads for the year of manufactur
6).
- For single wire, threads are inserted during the
between core and insulating sheath or between the
insulation sheath.
- For multi wire, twisted or not, threads are inse
external sheth and the conductors.
The thread and printing must resist the maximum op
the wires.

R TABLE 5 - Colored Thread Identification Coding of

VENDOR	NUMBER OF THREADS	THREAD COLOR
FILOTEX	2	Black-Grey
FILECA	3	Black-Yellow-Black
KABELMETAL	2	Red-Green
REINSHAGEN	1	Pink
BICC	3	Brown-Green-Red
AXON	2	Blue-White

R TABLE 6 - Colored Thread Identification Coding of Year of Manufacture

EFF : ALL

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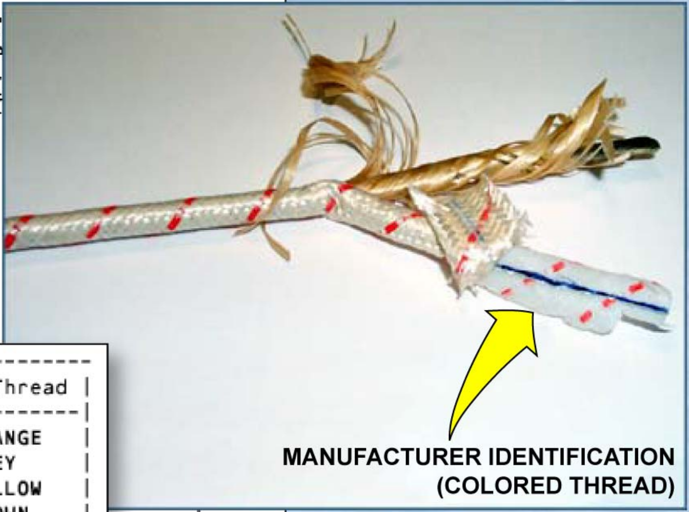
IDENTIFICATION BY COLORED THREAD

Year	1st Thread	2nd Thread	Year	1st Thread	2nd Thread
1971	BROWN	RED	1994	GREEN	ORANGE
1972	GREEN	BLACK	1995	GREEN	GREY
1973	GREEN	WHITE	1996	GREEN	YELLOW
1974	GREEN	RED	1997	GREEN	BROWN
1975	BLACK	WHITE	1998	GREEN	BLUE
1976	BLACK	RED	1999	BLUE	VIOLET
1977	WHITE	RED	2000	BLUE	ORANGE
1978	BLUE	BLACK	2001	BLUE	GREY
1979	BLUE	WHITE	2002	BLUE	YELLOW
1980	BLUE	RED	2003	BLUE	BROWN
1981	YELLOW	BLACK	2004	BROWN	VIOLET
1982	YELLOW	WHITE	2005	BROWN	ORANGE
1983	YELLOW	RED	2006	BROWN	GREY
1984	GREY	BLACK	2007	BROWN	YELLOW
1985	GREY	WHITE	2008	YELLOW	VIOLET
1986	GREY	RED	2009	YELLOW	ORANGE
1987	VIOLET	BLACK	2010	YELLOW	GREY
1988	VIOLET	WHITE	2011	GREY	VIOLET
1989	VIOLET	RED	2012	GREY	ORANGE
1990	ORANGE	BLACK	2013	ORANGE	VIOLET
1991	ORANGE	WHITE	2014	BROWN	BLACK
1992	ORANGE	RED	2015	BROWN	WHITE
1993	GREEN	VIOLET			



IDENTIFICATION BY COLORED THREAD

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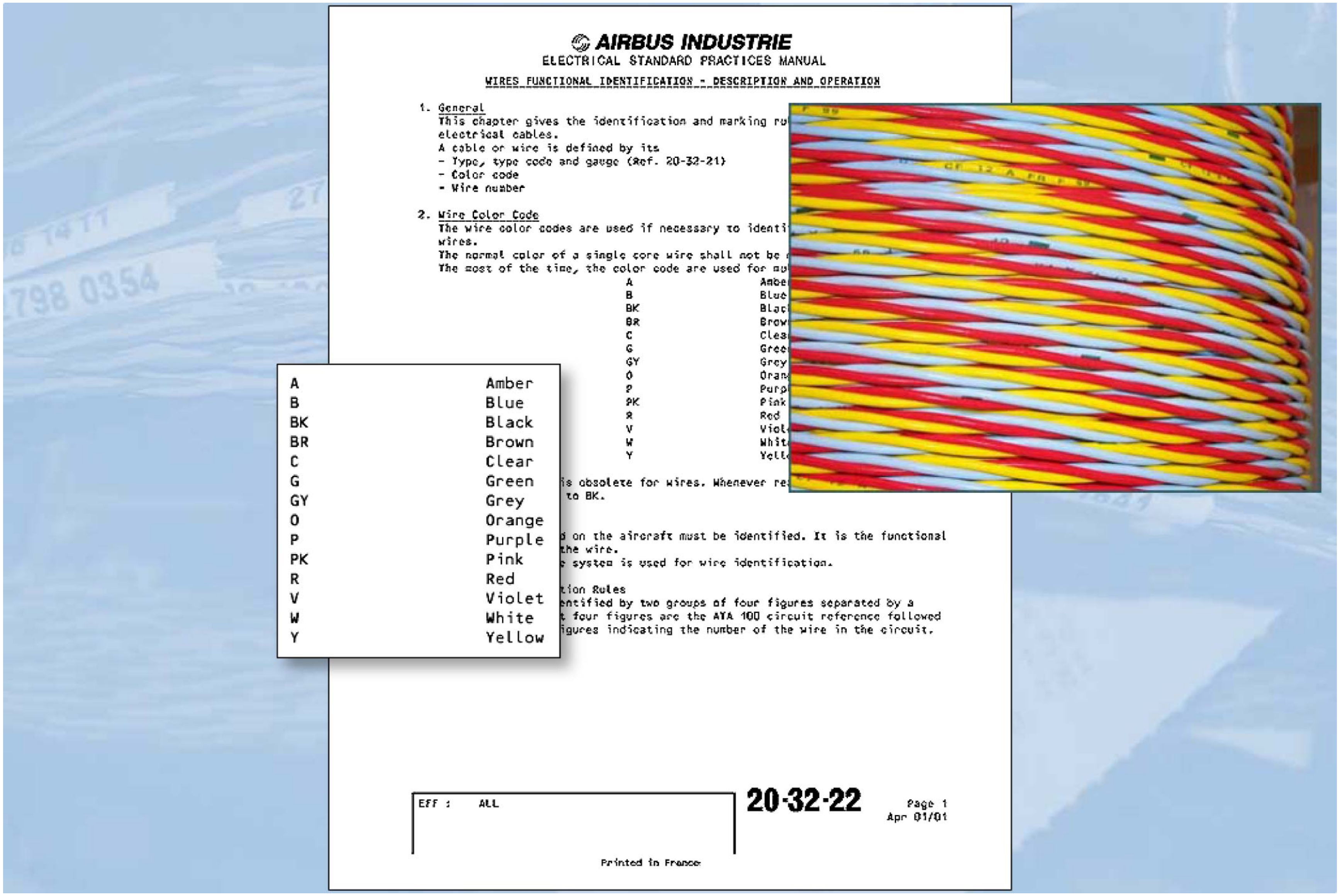
WIRE IDENTIFICATION

WIRES FUNCTIONAL IDENTIFICATION

To facilitate identification, wire color codes are used.
All wires installed on aircraft must be identified. This is the functional identification of the wire.
A numeric reference system is used for wire identification.



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ELECTRICAL STANDARD PRACTICES MANUAL
WIRES FUNCTIONAL IDENTIFICATION - DESCRIPTION AND OPERATION

1. General
This chapter gives the identification and marking ru
electrical cables.
A cable or wire is defined by its
- Type, type code and gauge (Ref. 20-32-21)
- Color code
- Wire number

2. Wire Color Code
The wire color codes are used if necessary to identi
wires.
The normal color of a single core wire shall not be
The most of the time, the color code are used for mu

A	Amber
B	Blue
BK	Black
BR	Brown
C	Clear
G	Green
GY	Grey
O	Orange
P	Purple
PK	Pink
R	Red
V	Violet
W	White
Y	Yellow

is obsolete for wires. Whenever re
to BK.

d on the aircraft must be identified. It is the functional
the wire.
e system is used for wire identification.

tion Rules
entified by two groups of four figures separated by a
t four figures are the AYA 100 circuit reference followed
igures indicating the number of the wire in the circuit.

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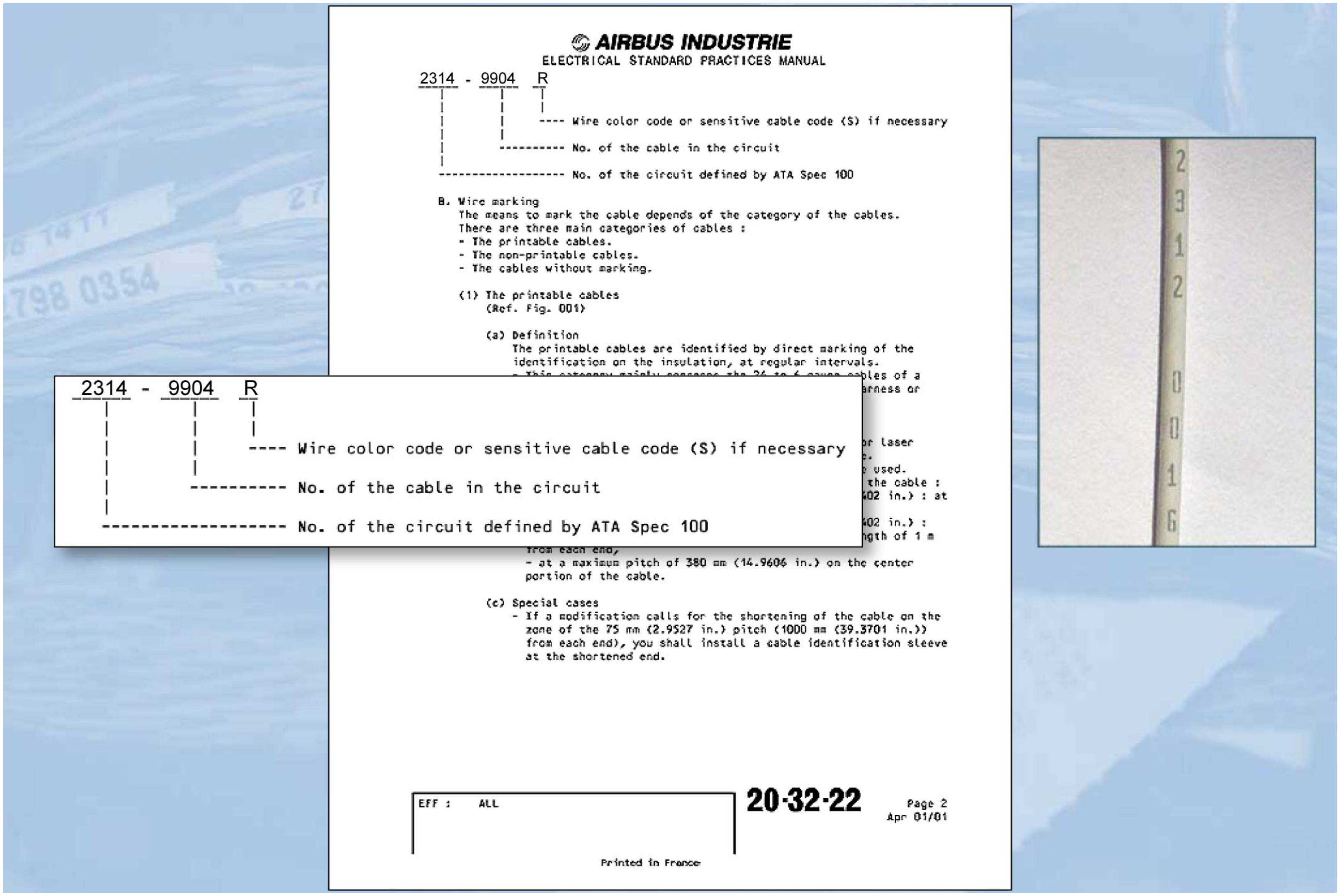
WIRES FUNCTIONAL IDENTIFICATION



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```
2314 - 9904  R
 |       |   |
 |       |   |---- Wire color code or sensitive cable code (S) if necessary
 |       |
 |       |---------- No. of the cable in the circuit
 |
 |------------------- No. of the circuit defined by ATA Spec 100
```

B. Wire marking
The means to mark the cable depends of the category of the cables.
There are three main categories of cables :
- The printable cables.
- The non-printable cables.
- The cables without marking.

(1) The printable cables
(Ref. Fig. 001)

(a) Definition
The printable cables are identified by direct marking of the identification on the insulation, at regular intervals.
... cables of a ... arness or
... or laser ... used. ... the cable : ... 402 in.) : at ... 402 in.) : ... ngth of 1 m from each end,
- at a maximum pitch of 380 mm (14.9606 in.) on the center portion of the cable.

(c) Special cases
- If a modification calls for the shortening of the cable on the zone of the 75 mm (2.9527 in.) pitch (1000 mm (39.3701 in.)) from each end), you shall install a cable identification sleeve at the shortened end.

EFF : ALL

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WIRES FUNCTIONAL IDENTIFICATION

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WIRE IDENTIFICATION

WIRE MARKING

The means to mark the cable depends on the category of the cables.
There are three main categories of cable:
- printable cables.
- non-printable cables.
- cables without marking.

The printable cables are identified by direct marking of the identification on the insulation, at regular intervals.
- This category mainly concerns the 24 to 6 gauge cables of a lenght of more than 75mm (2.9527 in.) (Aircraft harness or large VU harness).

The non-printable cables are cables that cannot have direct marking due to their physical structure.
The non-printable cables are cables that cannot have direct marking due to their physical structure.
The cables are identified with NSA 937201 sleeves.
These sleeves can be printed and bear the cable identification characters.
The sleeves are white with black printing.
Cables without markings (Not identified) are:
- Cables shorter than 150mm (5.9055).
- Ground pick-up cables (ferrule to ferrule or to connector).
- Cables used for circuit breaker monitoring (only for A320).
- Monitoring cables connecting two adjacent in-line circuit breakers (only A330-A340), cables inside small VUs (BF type - flexible cables).

PRINTABLE CABLES

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ELECTRICAL STANDARD PRACTICES M

2314 - 9904 R

---- Wire color code or sensitive cab

---------- No. of the cable in the circuit

------------------ No. of the circuit defined by AT

B. Wire marking
The means to mark the cable depends of the catego
There are three main categories of cables :
- The printable cables.
- The non-printable cables.
- The cables without marking.

(1) The printable cables
(Ref. Fig. 001)

(a) Definition
The printable cables are identified by di
identification on the insulation, at regu
- This category mainly concerns the 24 to
length of more than 75 mm (2.9527 in.)
large VU harness).

(b) Operation
- For the single-wire cables, the hot stamp marking or laser marking shall be used depending on the coating code.
- For the shielded cables, the laser marking shall be used.
Printing shall be performed on the whole length of the cable :
- For the cables of a length less than 2000 mm (78.7402 in.) : at a maximum pitch of 75 mm (2.9527 in.)
- For the cables of a length more than 2000 mm (78.7402 in.) :
- at a maximum pitch of 75 mm (2.9527 in.) on a length of 1 m from each end,
- at a maximum pitch of 380 mm (14.9606 in.) on the center portion of the cable.

(c) Special cases
- If a modification calls for the shortening of the cable on the zone of the 75 mm (2.9527 in.) pitch (1000 mm (39.3701 in.)) from each end), you shall install a cable identification sleeve at the shortened end.

ALL

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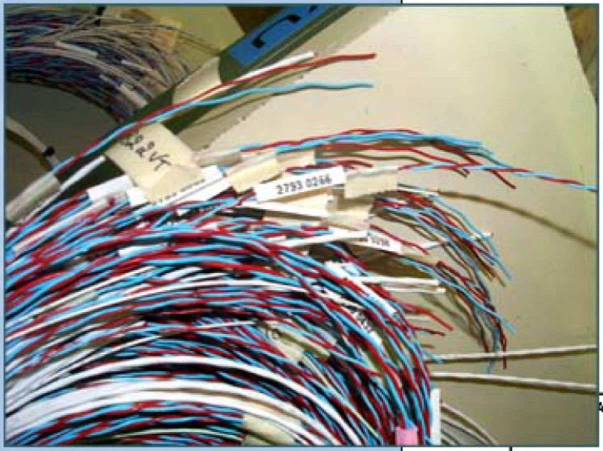
CABLES WITHOUT MARKINGS



NON-PRINTABLE CABLES

WIRE MARKING

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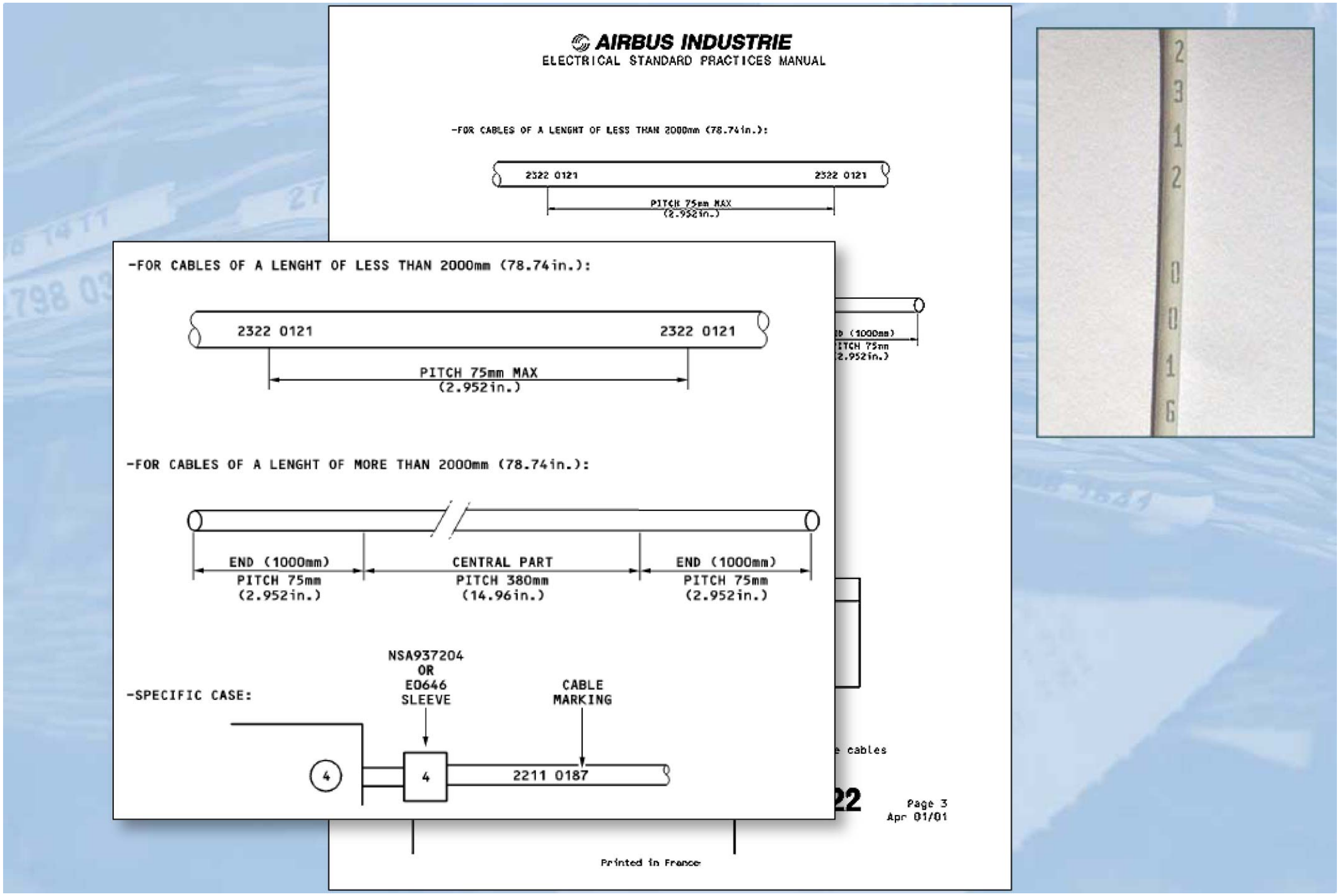
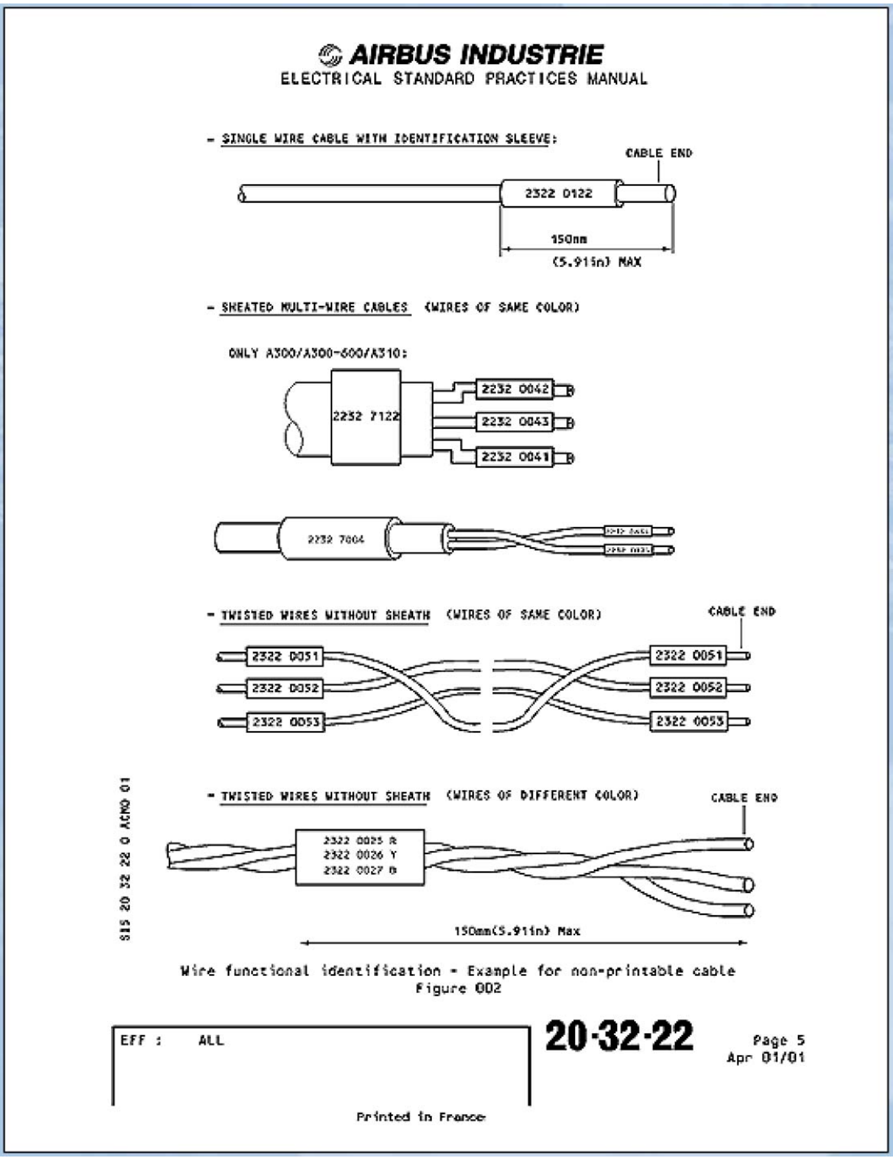


WIRE MARKING

X8U08481 - X0332T0 - XM2023000000001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- SINGLE WIRE CABLE WITH IDENTIFICATION SLEEVE:

- SHEATED MULTI-WIRE CABLES (WIRES OF SAME COLOR)

ONLY A300/A300-600/A310:

- TWISTED WIRES WITHOUT SHEATH (WIRES OF SAME COLOR)

- TWISTED WIRES WITHOUT SHEATH (WIRES OF DIFFERENT COLOR)

SIS 20 32 22 0 ACMO 01

Wire functional identification - Example for non-printable cable
Figure 002

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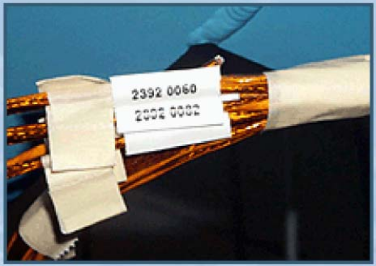
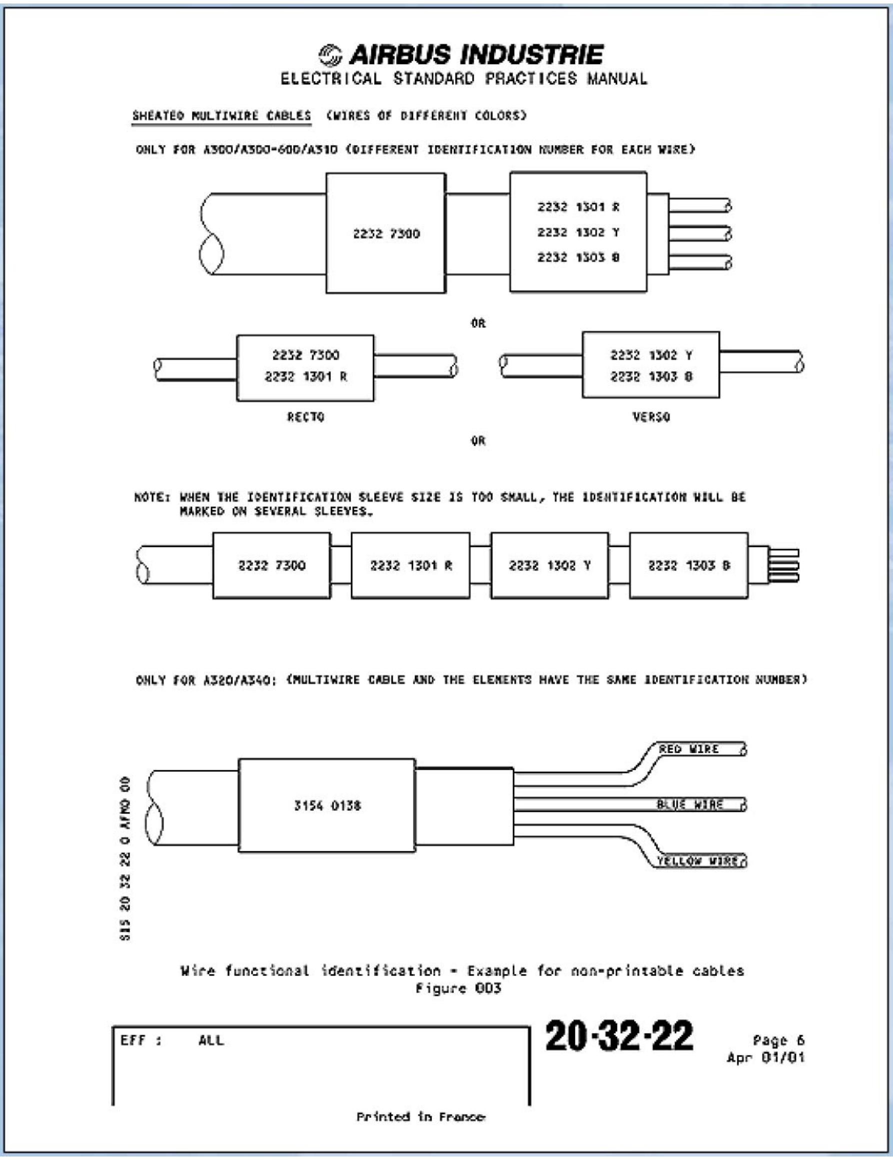


WIRE MARKING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SHEATED MULTIWIRE CABLES (WIRES OF DIFFERENT COLORS)

ONLY FOR A300/A300-600/A310 (DIFFERENT IDENTIFICATION NUMBER FOR EACH WIRE)

NOTE: WHEN THE IDENTIFICATION SLEEVE SIZE IS TOO SMALL, THE IDENTIFICATION WILL BE MARKED ON SEVERAL SLEEVES.

ONLY FOR A320/A340: (MULTIWIRE CABLE AND THE ELEMENTS HAVE THE SAME IDENTIFICATION NUMBER)

SIS 20 32 22 0 AFNO 00

Wire functional identification - Example for non-printable cables
Figure 003

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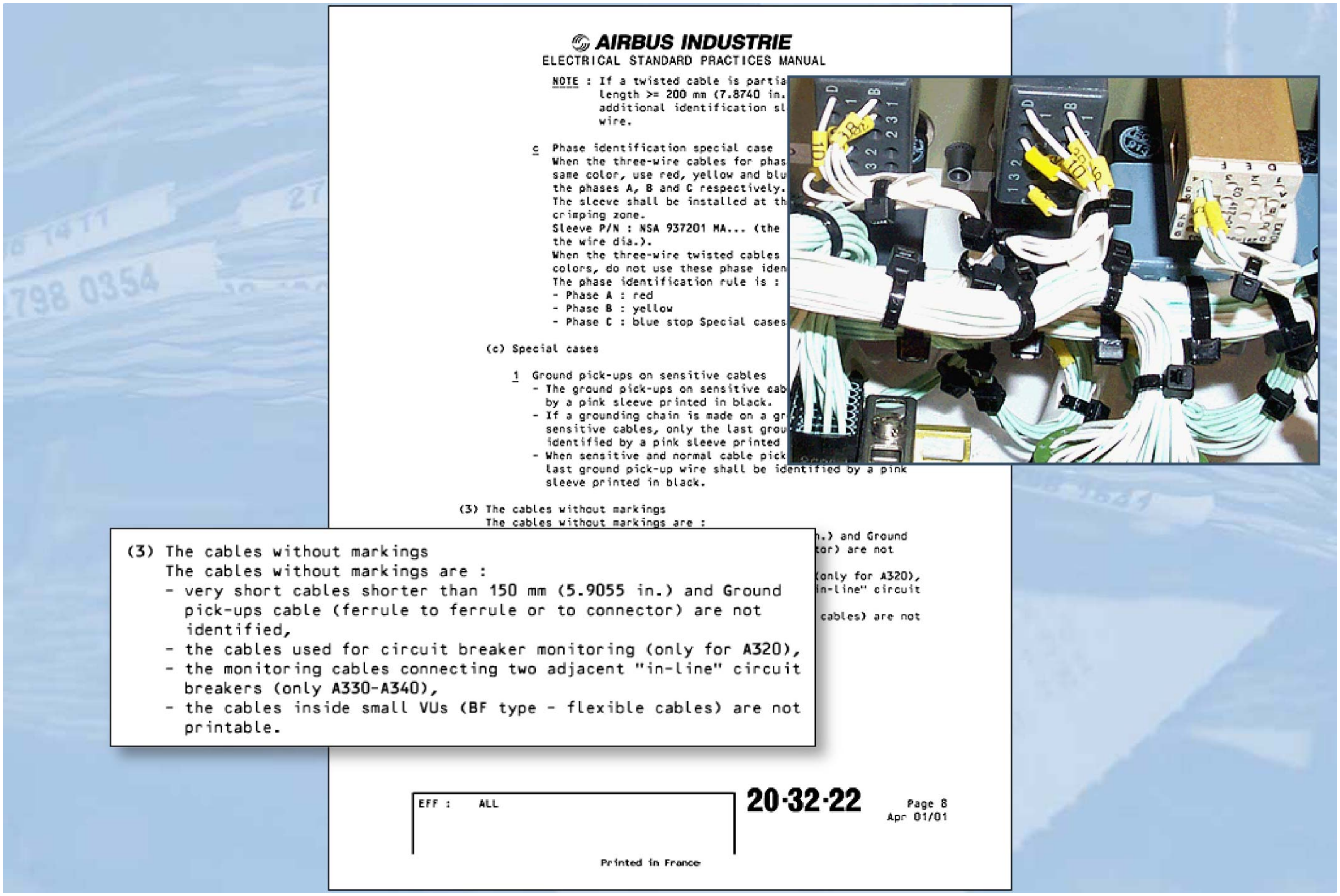
WIRE MARKING

X8U08481 - X0332T0 - XM2023000000001



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NOTE : If a twisted cable is partia
length >= 200 mm (7.8740 in.
additional identification sl
wire.

c Phase identification special case
When the three-wire cables for phas
same color, use red, yellow and blu
the phases A, B and C respectively.
The sleeve shall be installed at th
crimping zone.
Sleeve P/N : NSA 937201 MA... (the
the wire dia.).
When the three-wire twisted cables
colors, do not use these phase iden
The phase identification rule is :
- Phase A : red
- Phase B : yellow
- Phase C : blue stop Special cases

(c) Special cases

1 Ground pick-ups on sensitive cables
- The ground pick-ups on sensitive cab
by a pink sleeve printed in black.
- If a grounding chain is made on a gr
sensitive cables, only the last grou
identified by a pink sleeve printed
- When sensitive and normal cable pick
last ground pick-up wire shall be identified by a pink
sleeve printed in black.

(3) The cables without markings
The cables without markings are :
- very short cables shorter than 150 mm (5.9055 in.) and Ground
pick-ups cable (ferrule to ferrule or to connector) are not
identified,
- the cables used for circuit breaker monitoring (only for A320),
- the monitoring cables connecting two adjacent "in-line" circuit
breakers (only A330-A340),
- the cables inside small VUs (BF type - flexible cables) are not
printable.

EFF : ALL

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WIRE MARKING

WIRE MARKING

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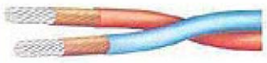
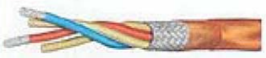
INSULATION QUALITIES

TYPES OF INSULATION

On aircraft, five main wire families are installed.
These wires have different characteristics.
For example ASNE0261 CF wire is designed for 600V and has a rating temperature of 200°C (392°F).
The insulator is kapton/FEP or PTFE.
FEP : Perfluorethylenepropylene.
PTFE : Polytetrafluorethylene.
For example ASNE0438 YV wire is designed for 600V and has a rating temperature of 180°C (362°F).
The insulator is Kapton-glass Nomex.
Wire characteristics depend on the areas in which they are installed.
For example, in the fire areas you generally have CF, DG wires.
Wire characteristics depend on the areas in which they are installed.
For example, in the hot areas you generally have CF, DG wires.
Wire characteristics depend on the areas in which they are installed.
For example, in the fuel and fuel vapors areas you commonly have CF wires.
Wire characteristics depend on the areas in which they are installed.
For example, in the hydraulics areas you commonly have CF, DK wires.
Wire characteristics depend on the areas in which they are installed.
For example, in the vibration areas you commonly have CF, DK wires.
Wire characteristics depend on the areas in which they are installed.
For example, in the severe weather and moisture prone areas (swamp) you commonly have CF, DK wires.
Wire characteristics depend on the areas in which they are installed.
For example, in the pressurized areas you generally have CF wires.
For cockpit panels BF wires.
For feeders YV wires.
For batteries DG wires.

	Specifications			Construction	AWG Size	Rating Temp.
	ASN/ABS/NSA		EN			
	Ref.	Type	Ref.			
	ASN E0261	CF	2266	• Conductor : Nickel Plated Copper (AWG 22 to 10) High Strength Nickel Plated Copper Alloy (AWG 26 & 24) • Insulation : Polyimide Tapes + Topcoat • Suitable for Hot Stamp and Laser (UV, CO^2, YAG, YAGx3) Marking • Application : Airframe Wiring	26 to 10	200°C
	ASN E0264	PF	2266	2 CF or EN 2266 Basic Cores Twisted Cable • Application : Airframe Wiring	26 to 10	200°C
		DM	2267-008A	• Conductor : Nickel Plated Copper (AWG 22 to 06) High Strength Nickel Plated Copper Alloy (AWG 26 & 24) • Insulation : Polyimide + PTFE Tapes • Suitable for UV Laser marking • Application : Airframe Wiring	26 to 06	260°C

	Specifications			Construction	AWG Size	Rating Temp.
	ABS 0386	WF	• Conductor • Insulation • Shield • Sheath • Application	Shielded and Sheathed 100 Ω Data Bus Twisted Pair : Silver Plated Copper Alloy : PTFE : Nickel Plated Copper Braid : Polyimide Tapes : Data Bus	24	200°C
		GJ	2714-011A	1 DMA or EN 2267-007 Basic Core + • Shield : Nickel Plated Copper Spiral Shield • Sheath : Polyimide + PTFE Tapes • Suitable for UV Laser Marking • Application : Airframe Wiring	26 to 10	260°C
	ASN E0270	SJ	2713	1 CF or EN 2266 Basic Core + • Shield : Nickel Plated Copper Spiral Shield • Sheath : Polyimide Tapes + Topcoat • Suitable for Hot Stamp and laser (UV; CO^2, YAGx3) Marking • Application : Airframe Wiring	ASN 26 to 14 EN 26 to 10	200°C
	ASN E0437	DL	• Conductor • Insulation • Application	: 27% Nickel Clad Copper Alloy for AWG 22 27% Nickel Clad Copper for other AWG : Silica Fiber + Fiberglass Braid + PTFE Tape : Fires Resistant Wires	22 to 16	260°C

TYPES OF INSULATION

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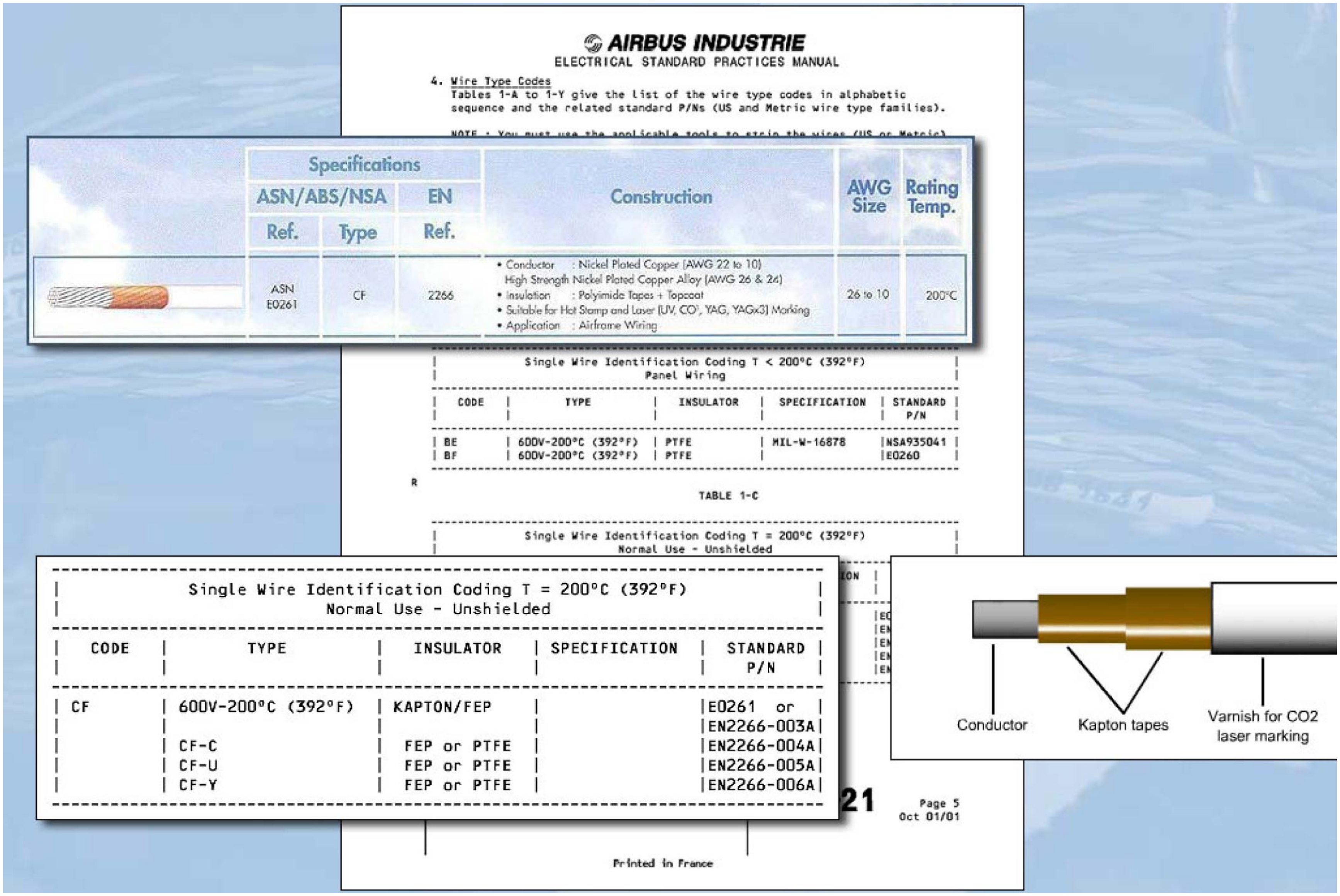

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4. Wire Type Codes
Tables 1-A to 1-Y give the list of the wire type codes in alphabetic sequence and the related standard P/Ns (US and Metric wire type families).

Specifications			Construction	AWG Size	Rating Temp.
ASN/ABS/NSA		EN			
Ref.	Type	Ref.			
ASN E0261	CF	2266	• Conductor : Nickel Plated Copper (AWG 22 to 10) High Strength Nickel Plated Copper Alloy (AWG 26 & 24) • Insulation : Polyimide Tapes + Topcoat • Suitable for Hot Stamp and Laser (UV, CO², YAG, YAGx3) Marking • Application : Airframe Wiring	26 to 10	200°C

Single Wire Identification Coding T < 200°C (392°F)
Panel Wiring

CODE	TYPE	INSULATOR	SPECIFICATION	STANDARD P/N
BE	600V-200°C (392°F)	PTFE	MIL-W-16878	NSA935041
BF	600V-200°C (392°F)	PTFE		E0260

TABLE 1-C

Single Wire Identification Coding T = 200°C (392°F)
Normal Use - Unshielded

CODE	TYPE	INSULATOR	SPECIFICATION	STANDARD P/N
CF	600V-200°C (392°F)	KAPTON/FEP		E0261 or EN2266-003A
	CF-C	FEP or PTFE		EN2266-004A
	CF-U	FEP or PTFE		EN2266-005A
	CF-Y	FEP or PTFE		EN2266-006A

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TYPES OF INSULATION

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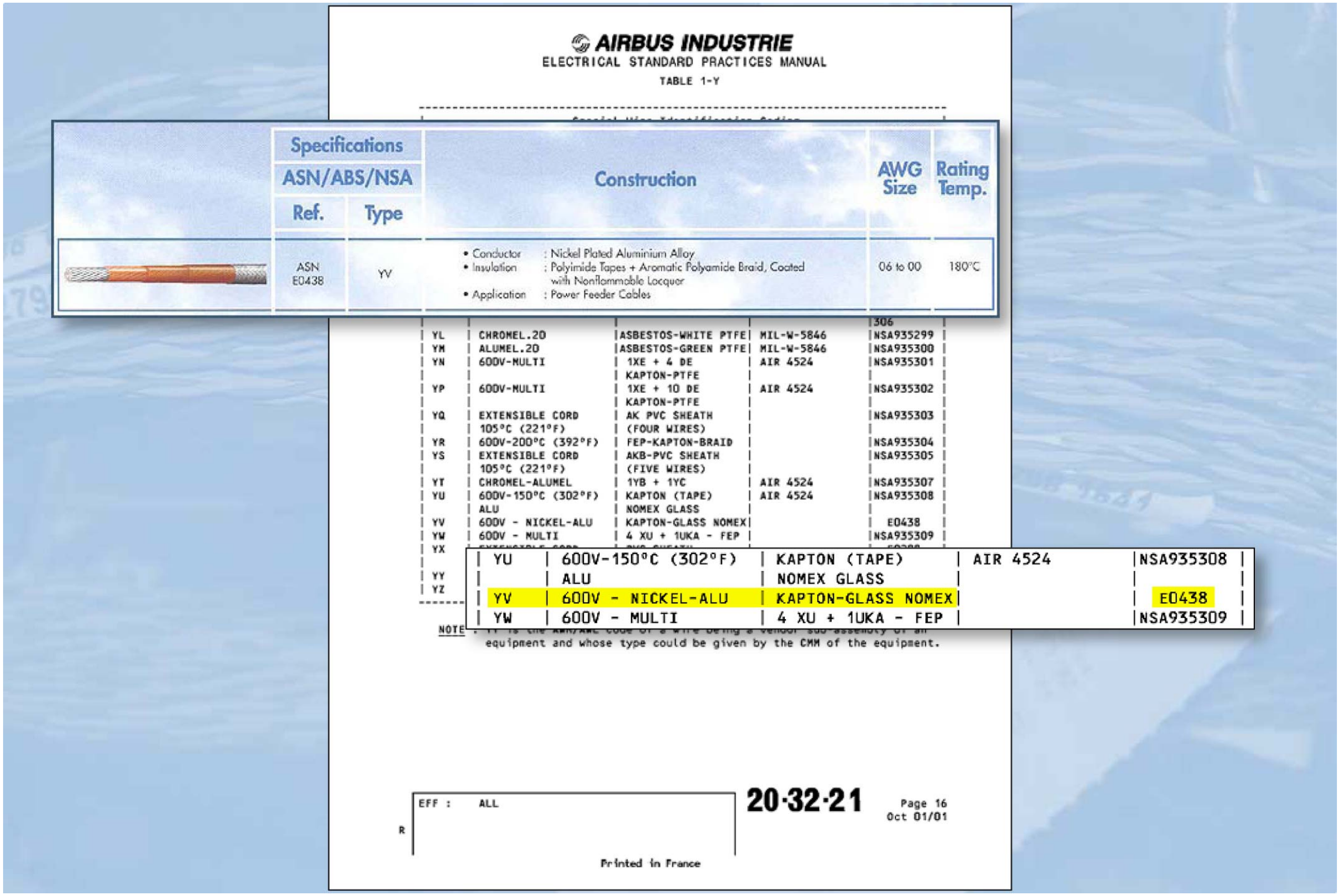

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TABLE 1-Y

Specifications ASN/ABS/NSA Ref.	Type	Construction	AWG Size	Rating Temp.
ASN E0438	YV	• Conductor : Nickel Plated Aluminium Alloy • Insulation : Polyimide Tapes + Aromatic Polyamide Braid, Coated with Nonflammable Lacquer • Application : Power Feeder Cables	06 to 00	180°C

				306
YL	CHROMEL.2D	ASBESTOS-WHITE PTFE	MIL-W-5846	NSA935299
YM	ALUMEL.2D	ASBESTOS-GREEN PTFE	MIL-W-5846	NSA935300
YN	600V-MULTI	1XE + 4 DE KAPTON-PTFE	AIR 4524	NSA935301
YP	600V-MULTI	1XE + 10 DE KAPTON-PTFE	AIR 4524	NSA935302
YQ	EXTENSIBLE CORD 105°C (221°F)	AK PVC SHEATH (FOUR WIRES)		NSA935303
YR	600V-200°C (392°F)	FEP-KAPTON-BRAID		NSA935304
YS	EXTENSIBLE CORD 105°C (221°F)	AKB-PVC SHEATH (FIVE WIRES)		NSA935305
YT	CHROMEL-ALUMEL	1YB + 1YC	AIR 4524	NSA935307
YU	600V-150°C (302°F) ALU	KAPTON (TAPE) NOMEX GLASS	AIR 4524	NSA935308
YV	600V - NICKEL-ALU	KAPTON-GLASS NOMEX		E0438
YW	600V - MULTI	4 XU + 1UKA - FEP		NSA935309
YX				
YY				
YZ				

YU	600V-150°C (302°F) ALU	KAPTON (TAPE) NOMEX GLASS	AIR 4524	NSA935308
YV	600V - NICKEL-ALU	KAPTON-GLASS NOMEX		E0438
YW	600V - MULTI	4 XU + 1UKA - FEP		NSA935309

NOTE : ... equipment and whose type could be given by the CMM of the equipment.

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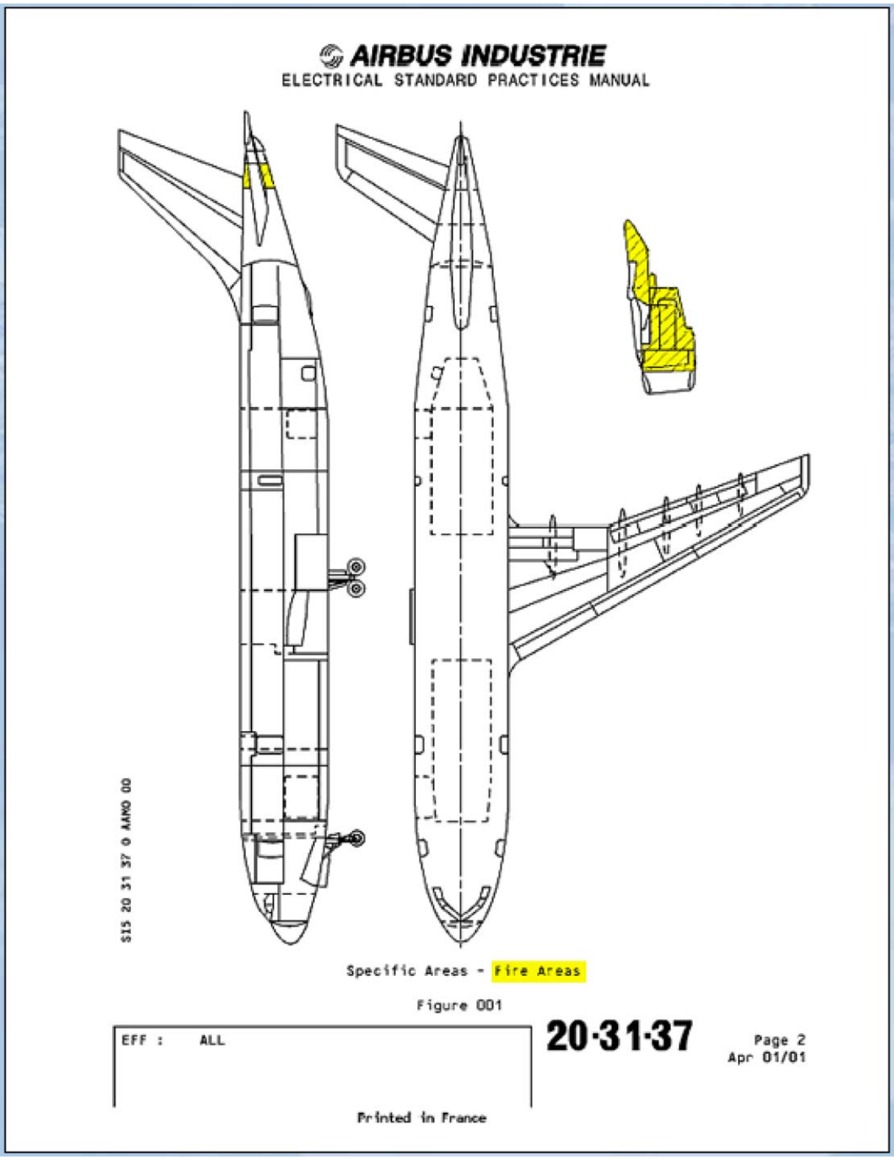
TYPES OF INSULATION



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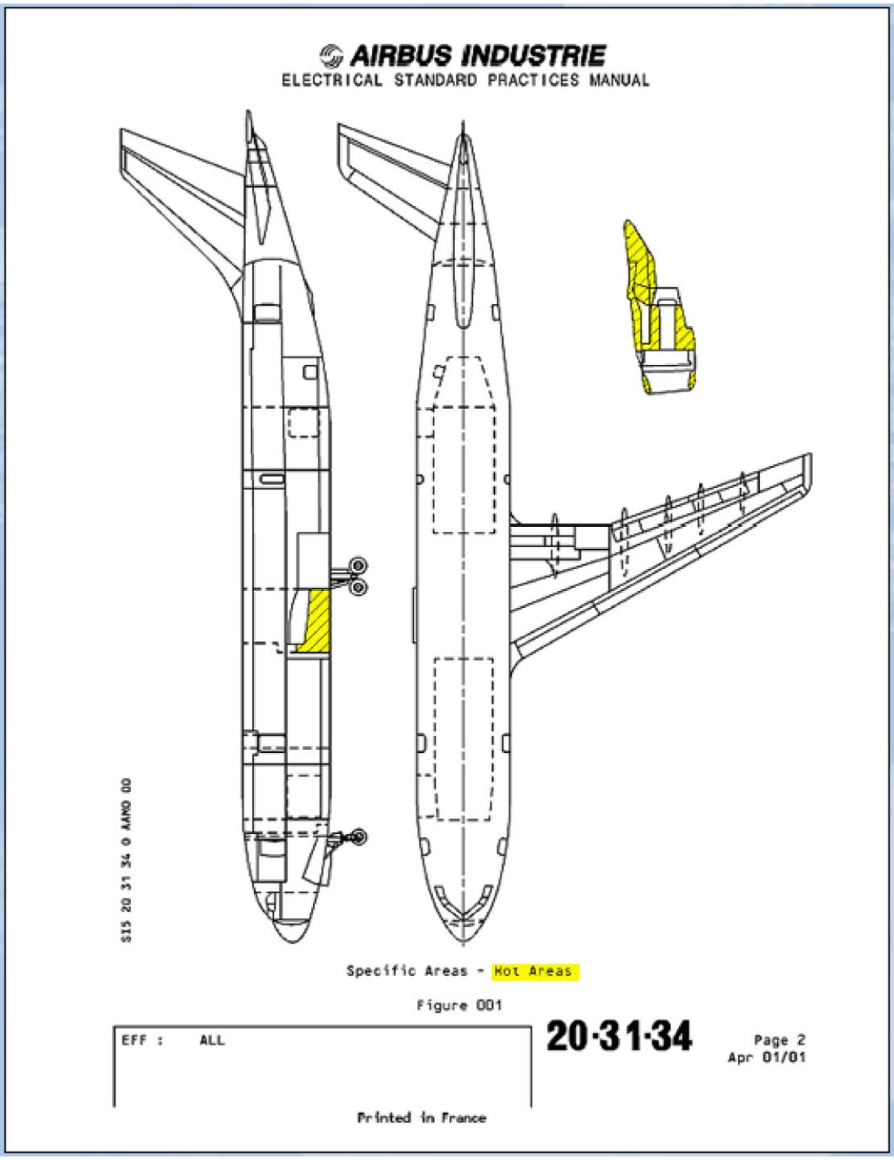

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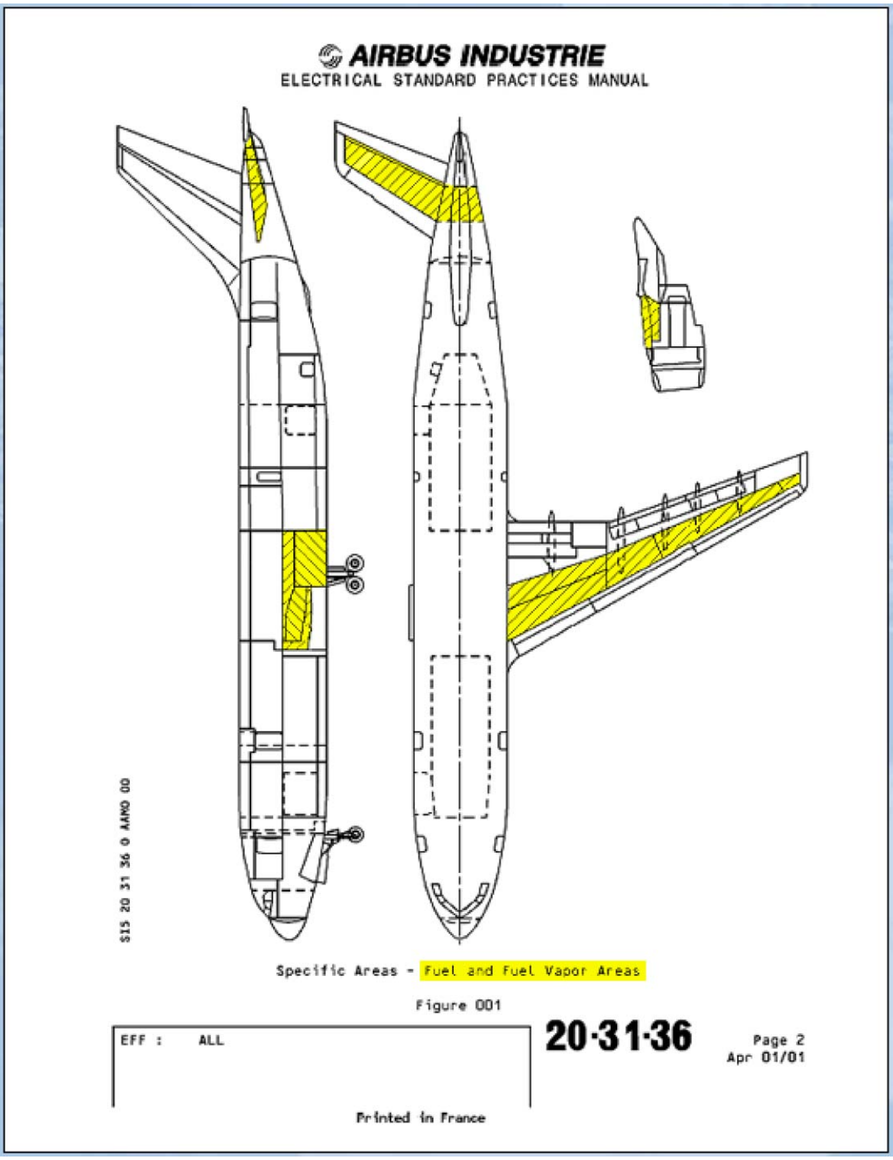

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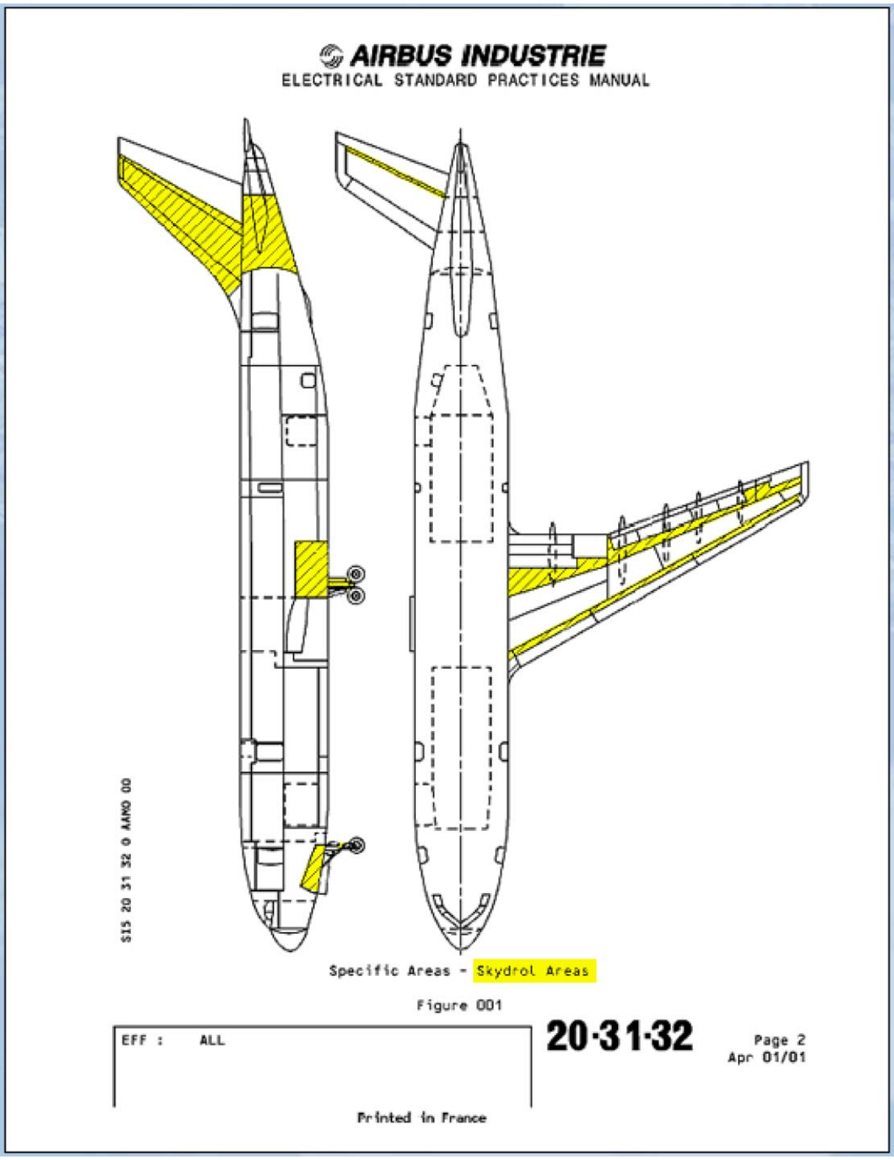

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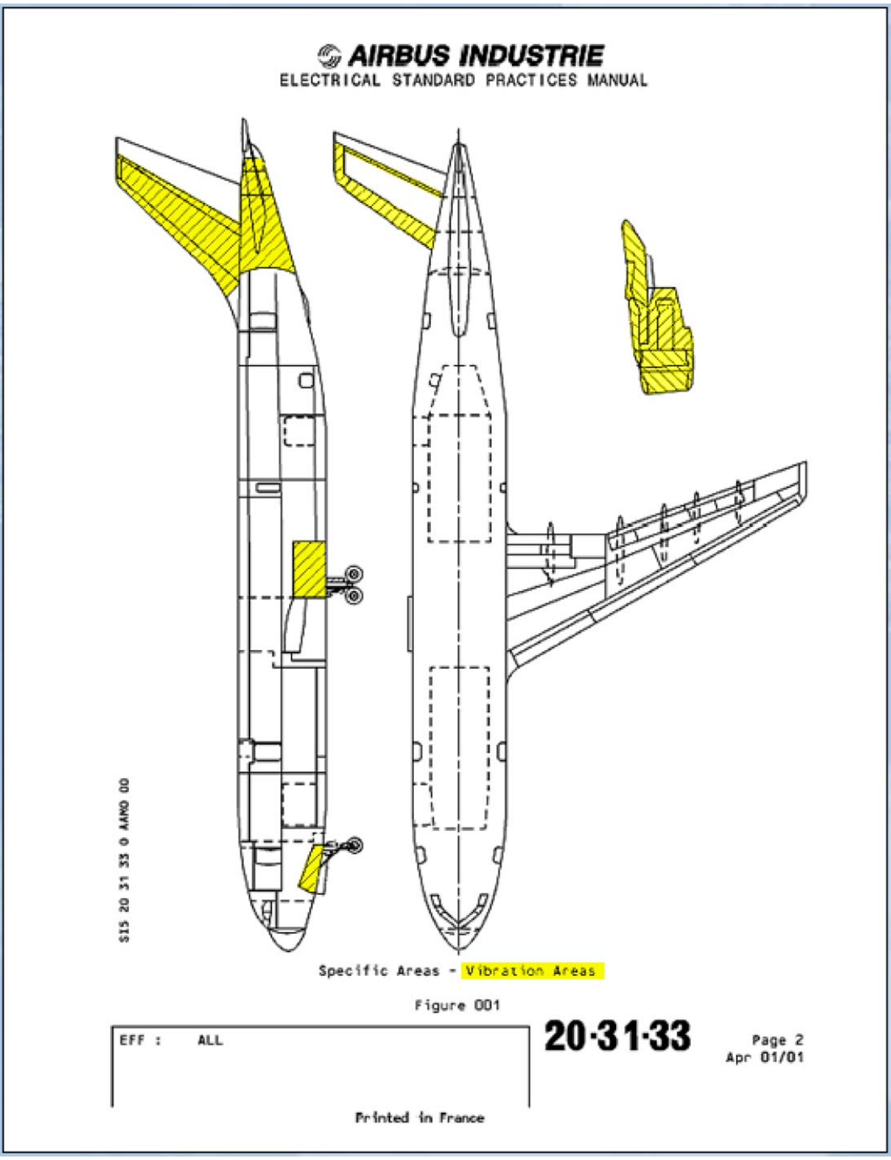

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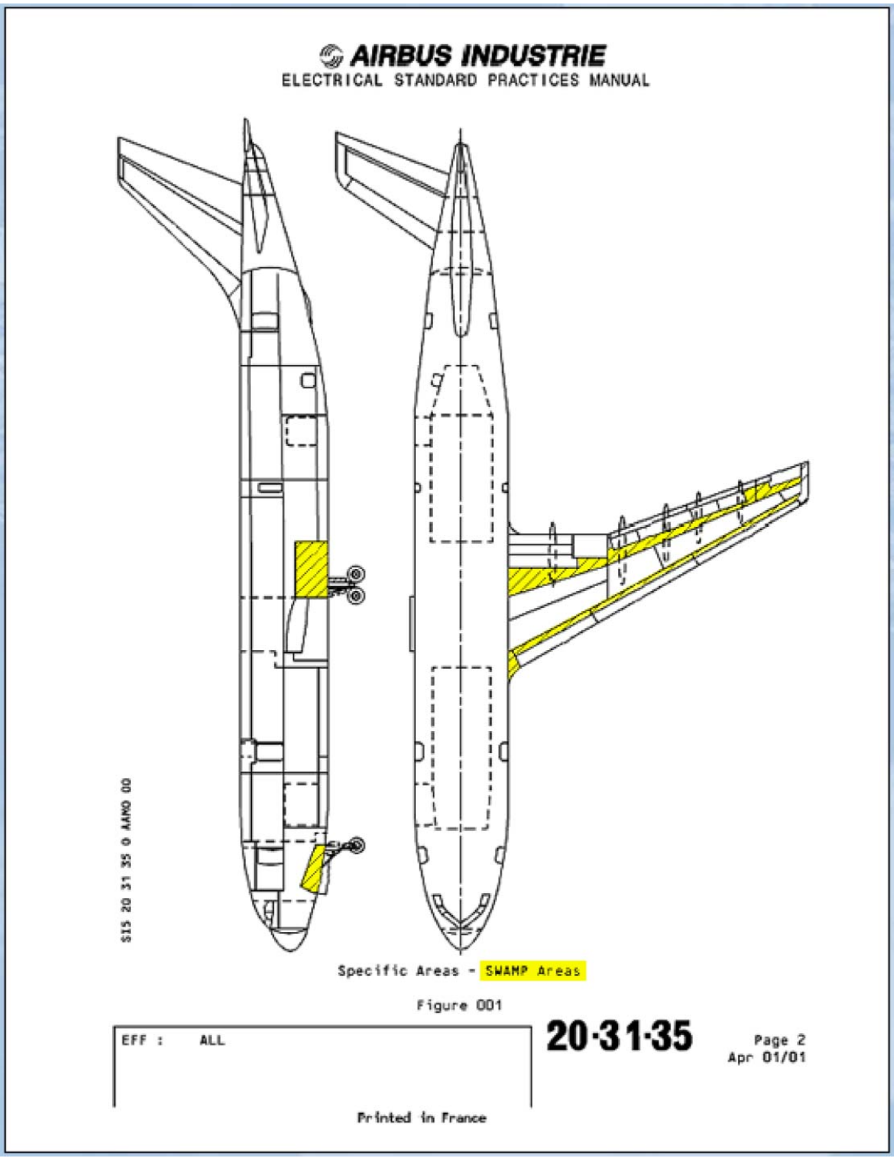

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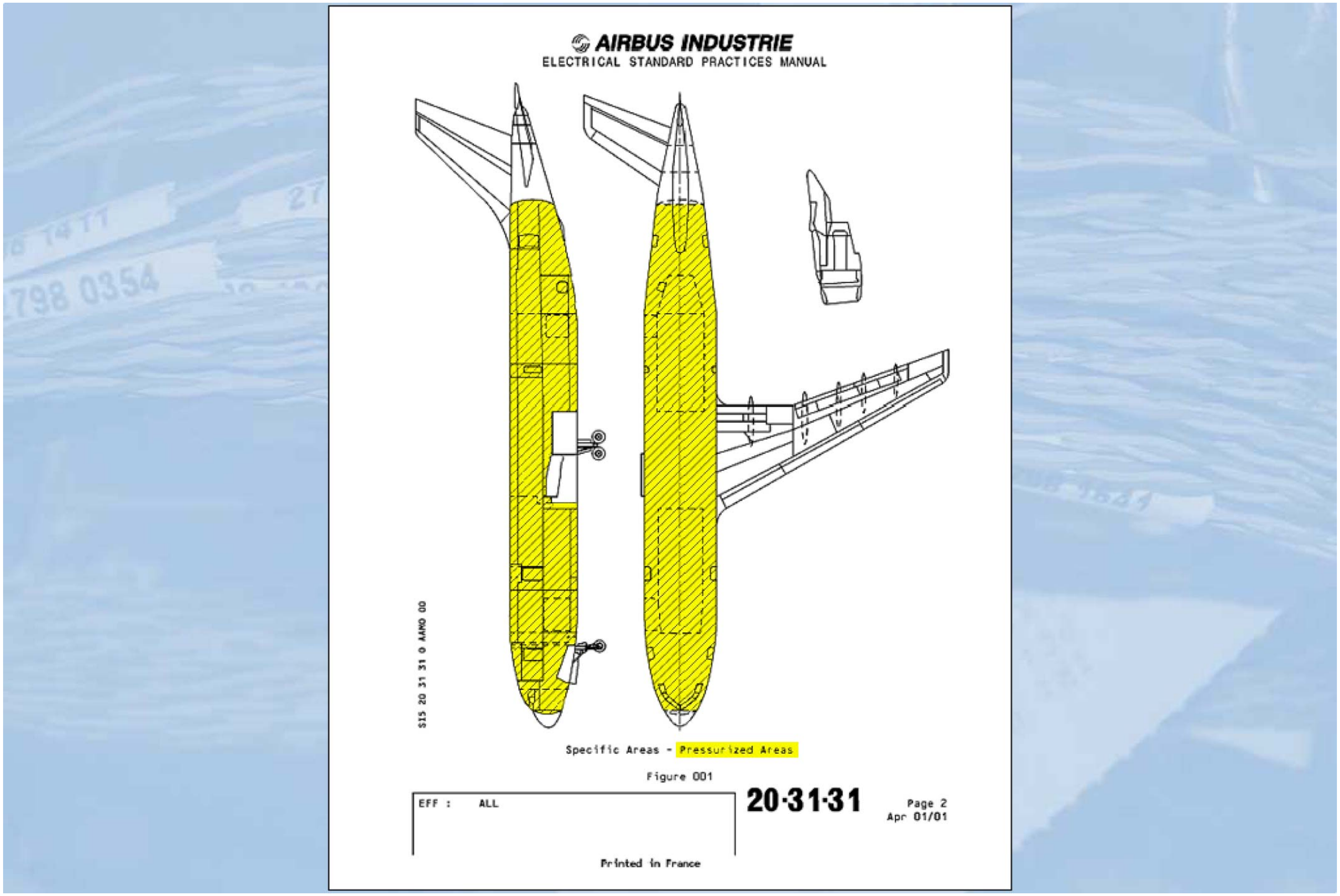

TYPES OF INSULATION

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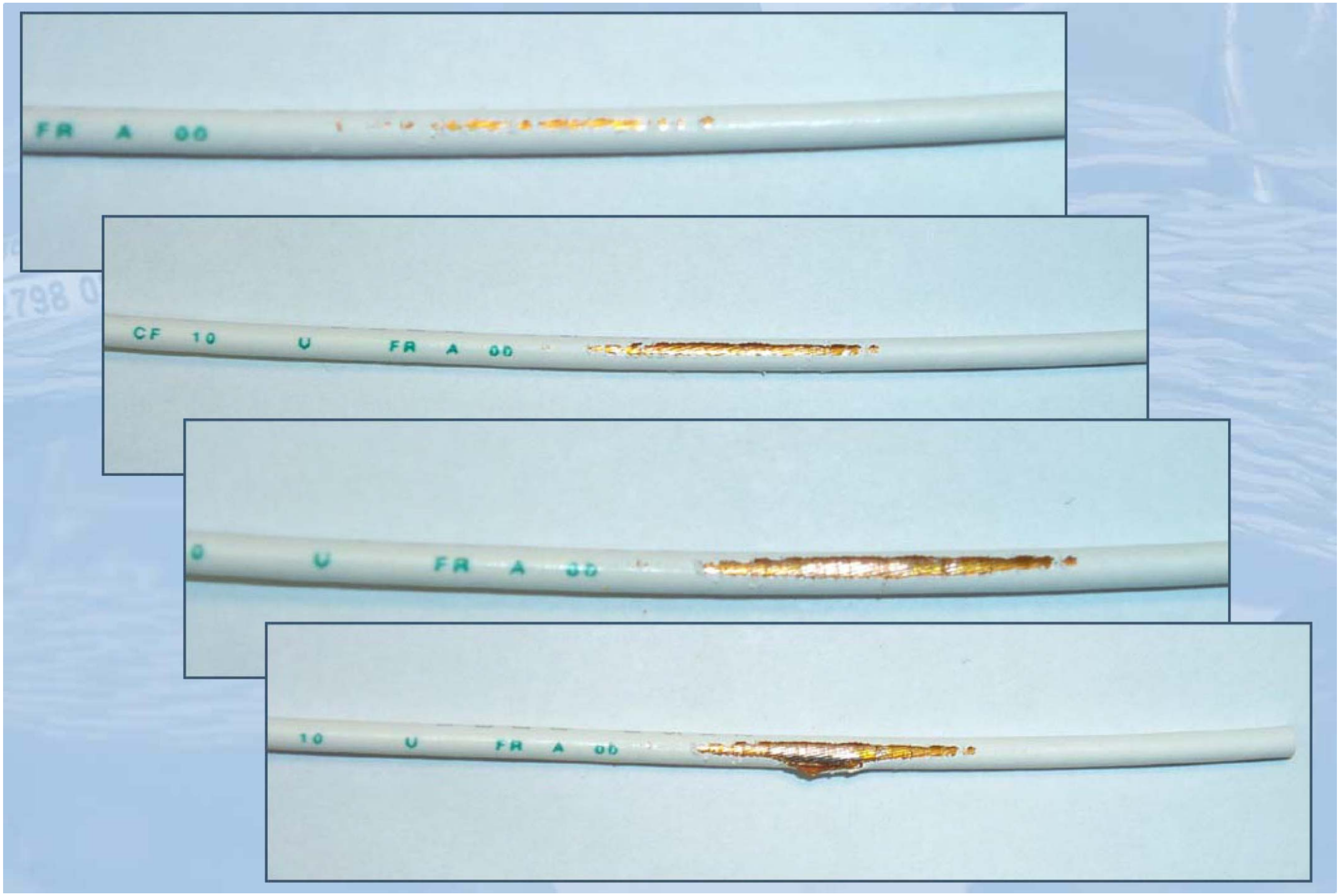
INSULATION QUALITIES

TYPICAL INSULATION DAMAGE

On aircraft, wire typical insulation damage causes are:
 Wire bundle/wire bundle or wire bundle/structure contact / chafing.
 Wire bundle sagging or badly secured.
 Wires damaged (large scale damage due to mechanical impact, overheat, localized chafing etc.)
 Lacing tape and/or ties missing/incorrectly installed.
 Wiring protection sheath/conduit deformity or incorrectly installed.
 End of sheath rubbing on end attachment device.
 Grommet missing or damaged.
 Dust and lint accumulation.
 Surface contamination by metal shavings / swarf.
 Contamination by liquids.
 Deterioration of previous repairs.



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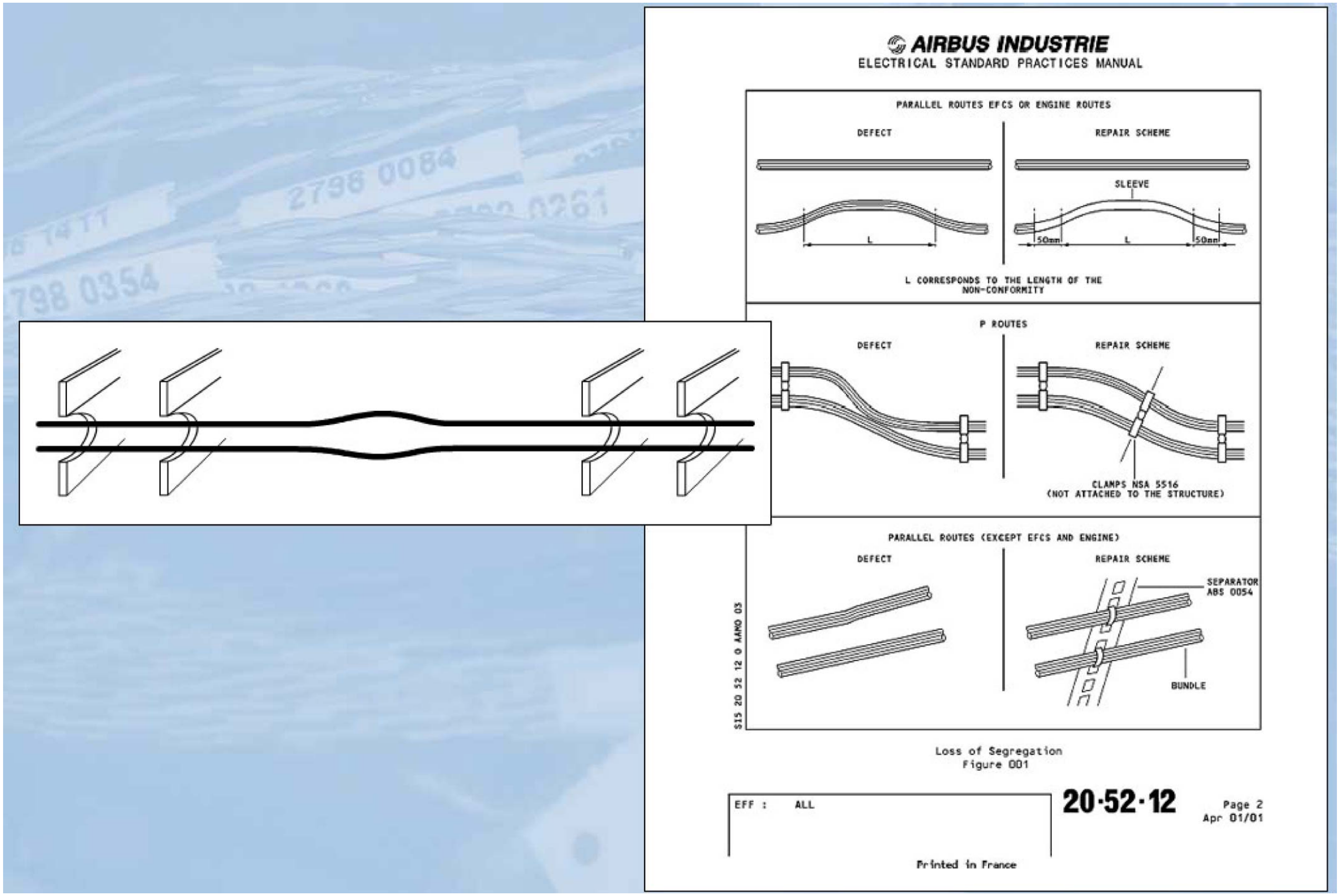

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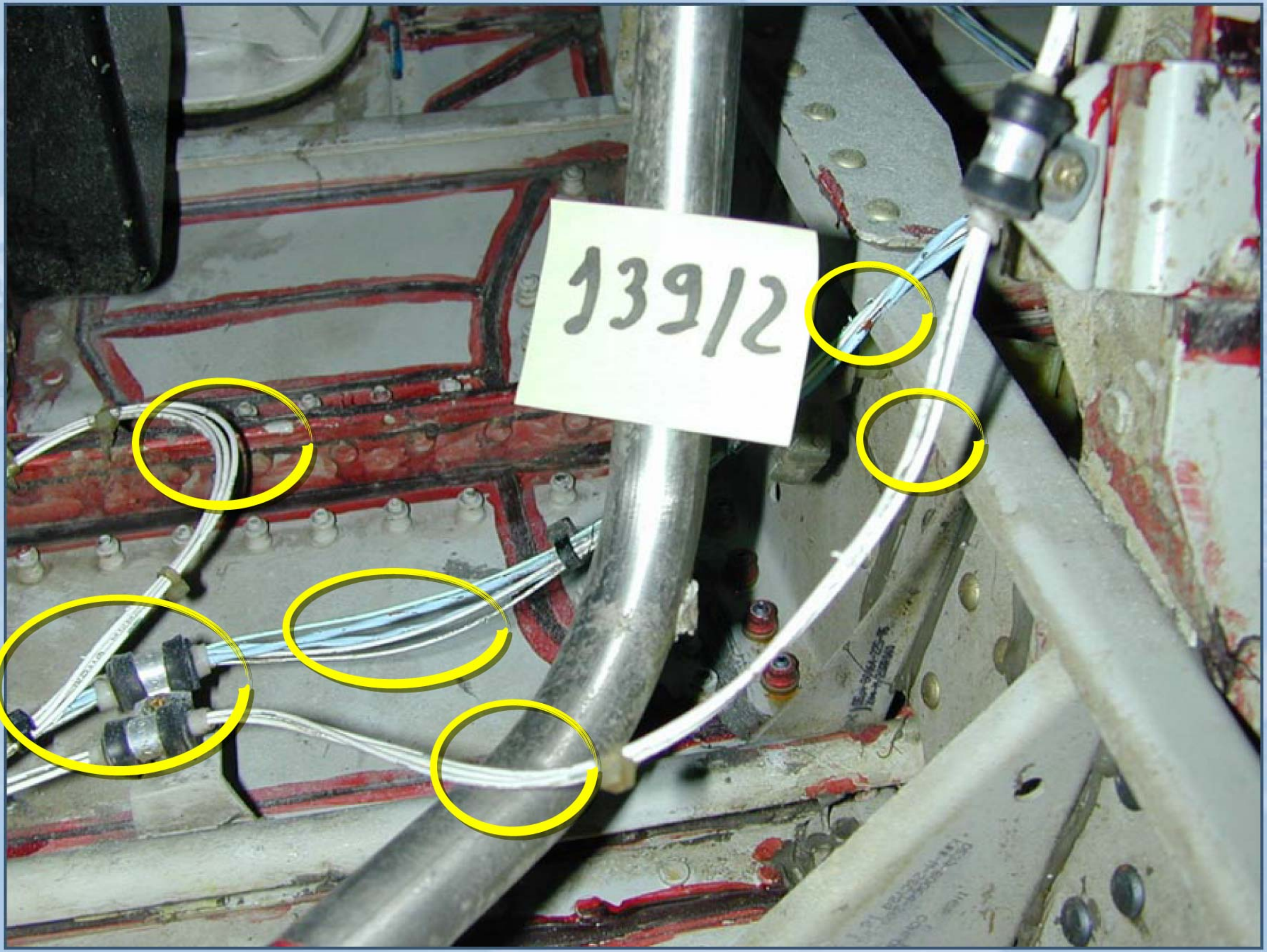

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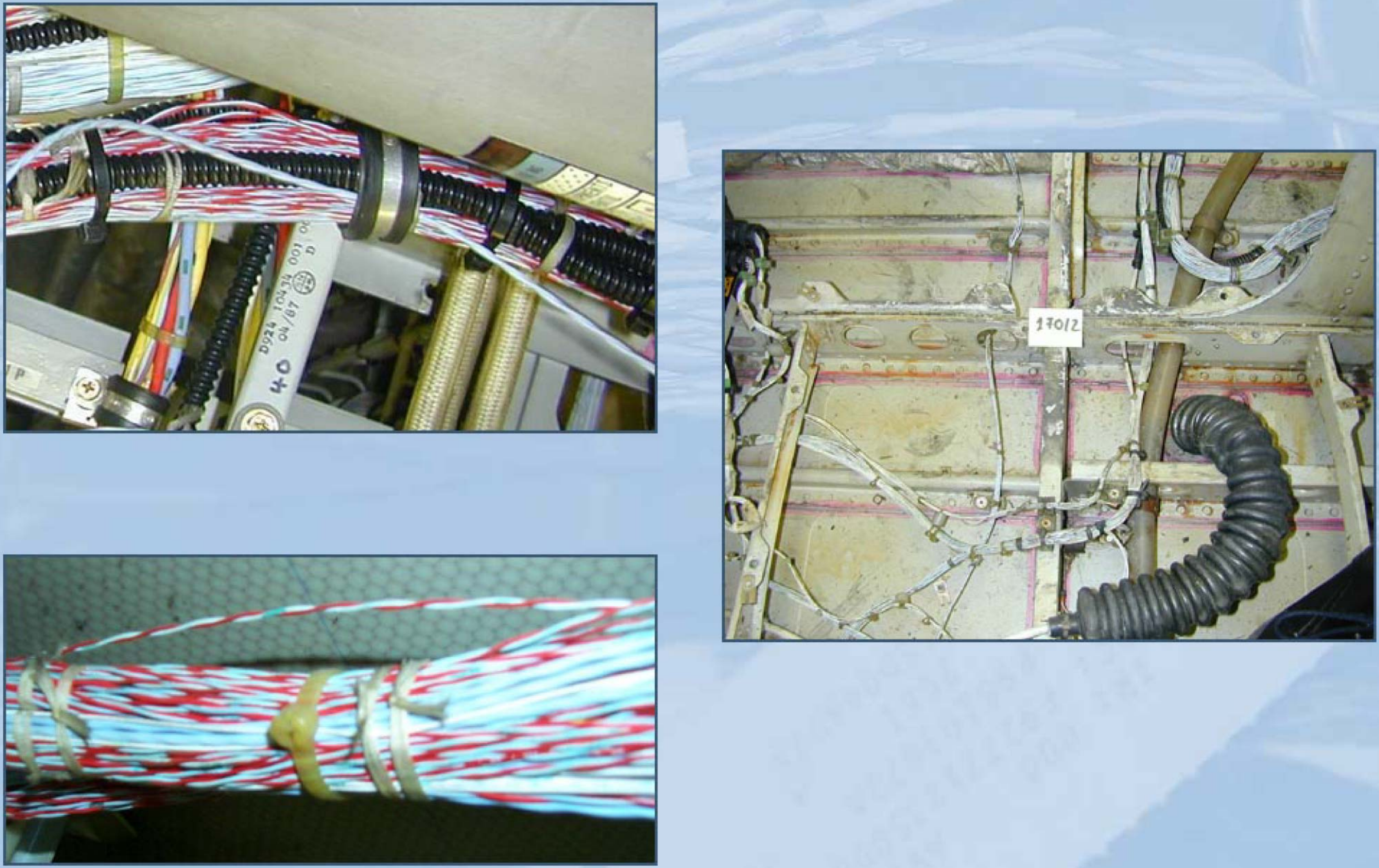

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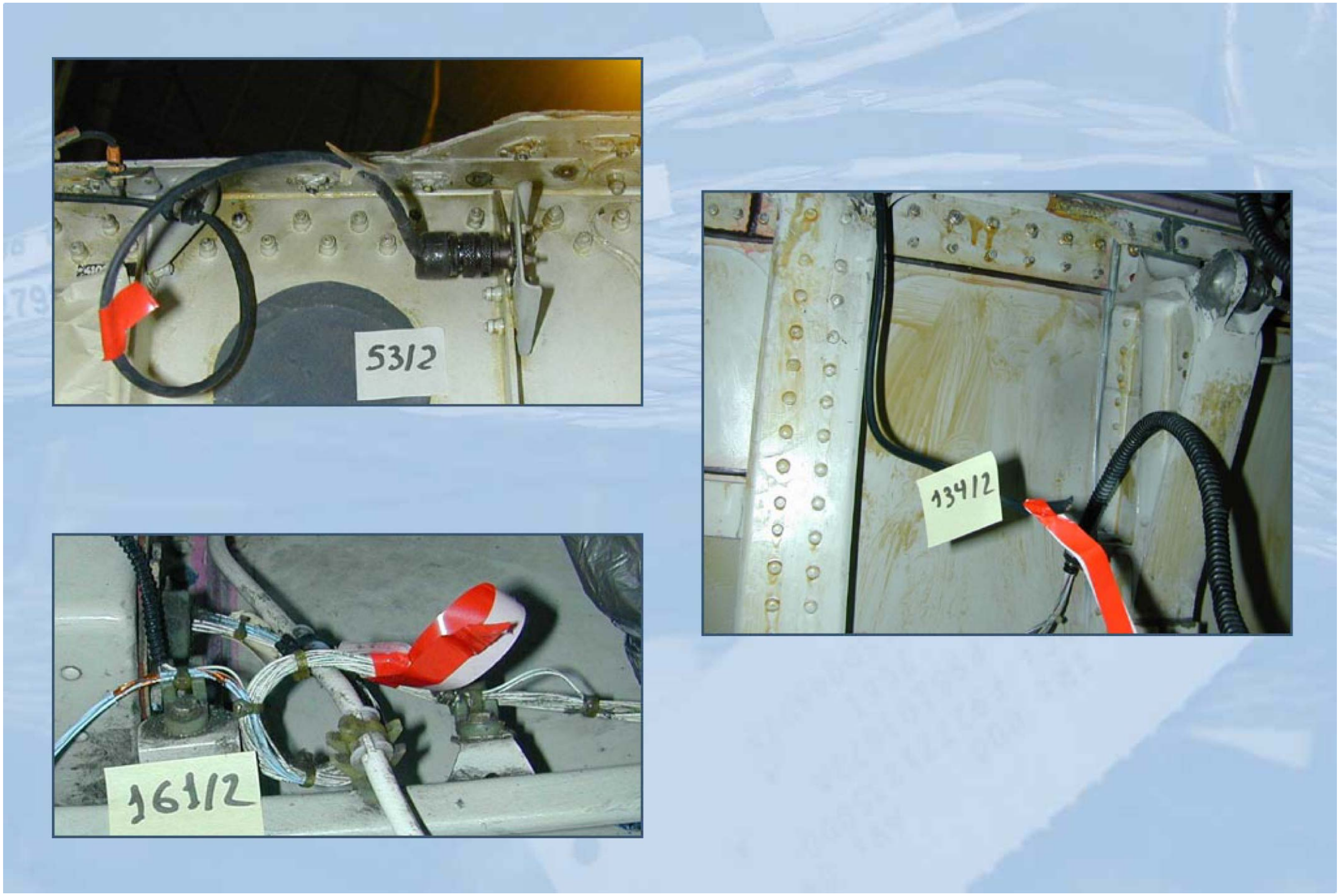

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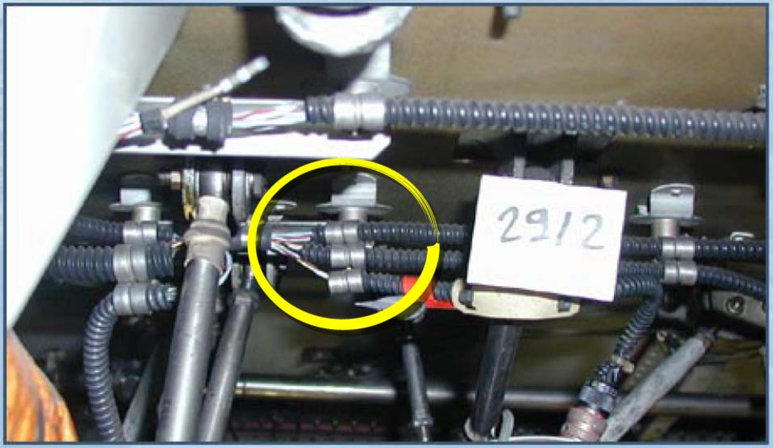

TYPICAL INSULATION DAMAGE

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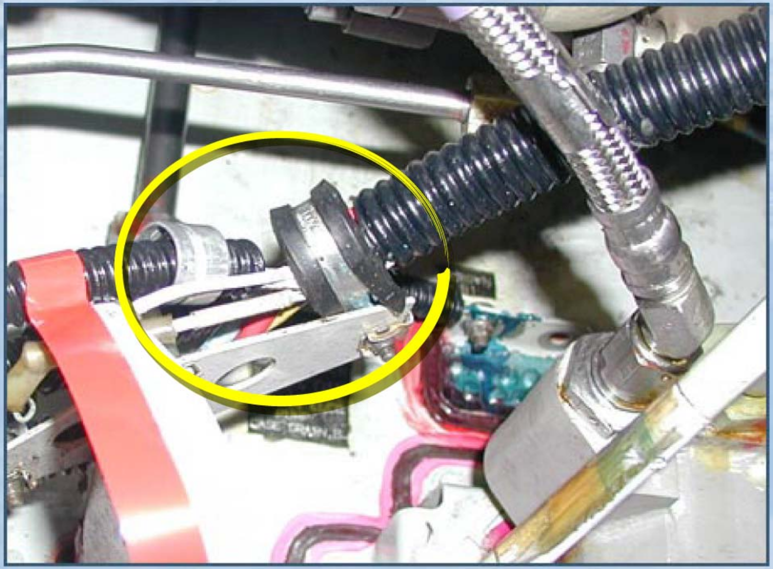

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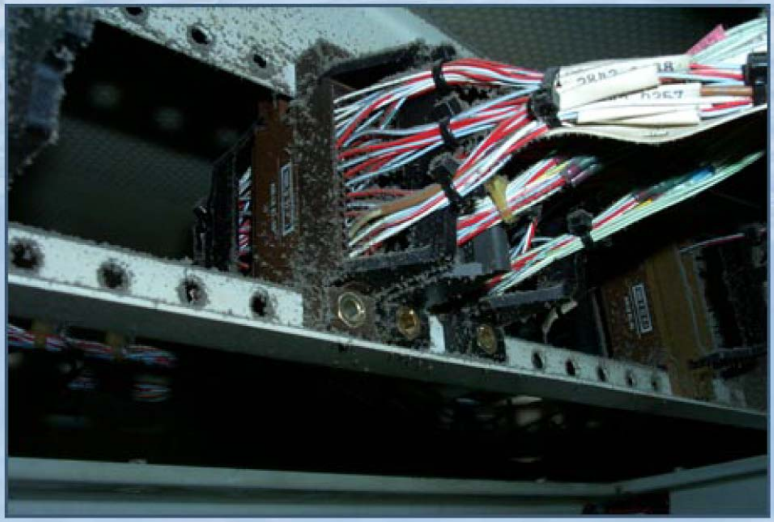

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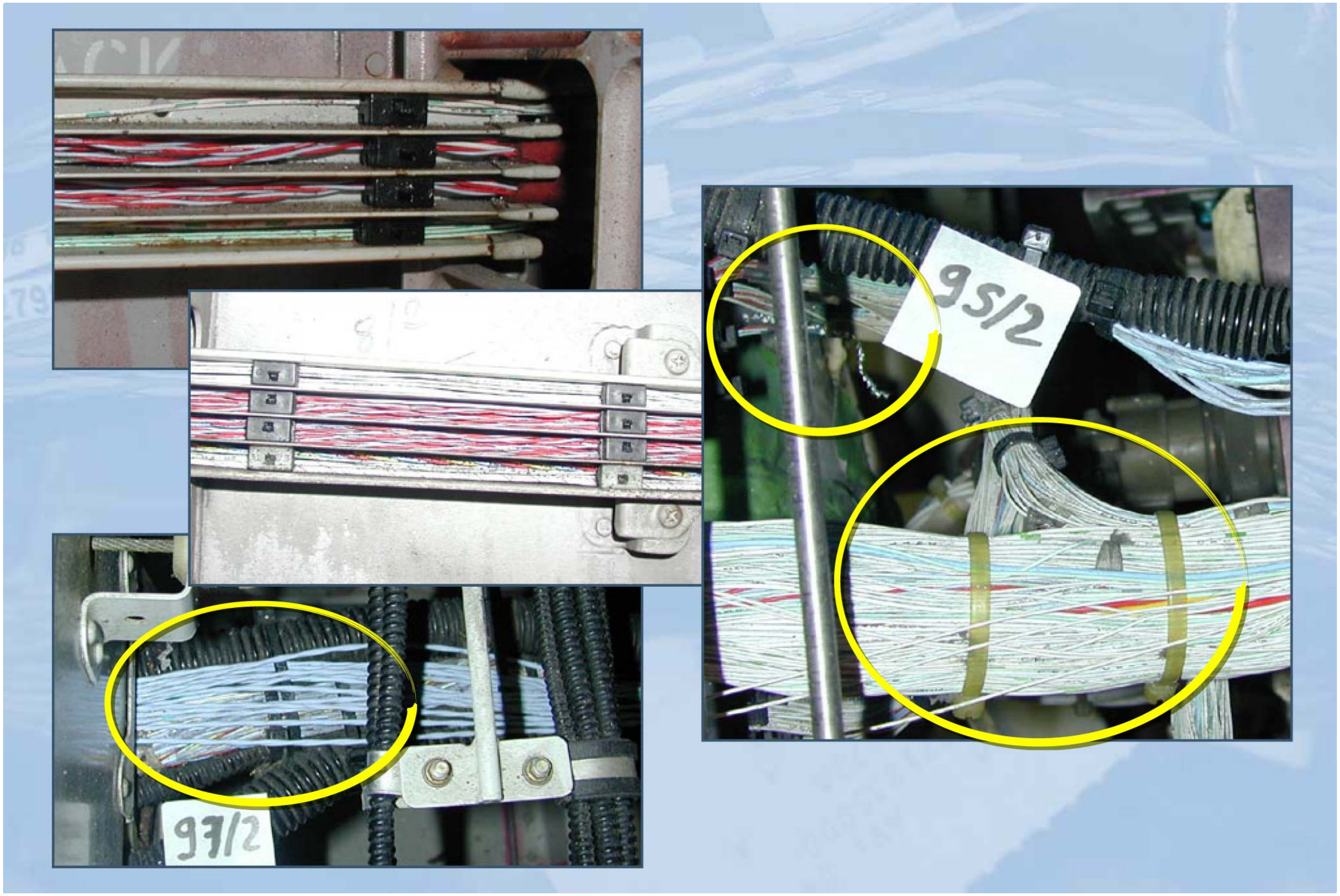

TYPICAL INSULATION DAMAGE

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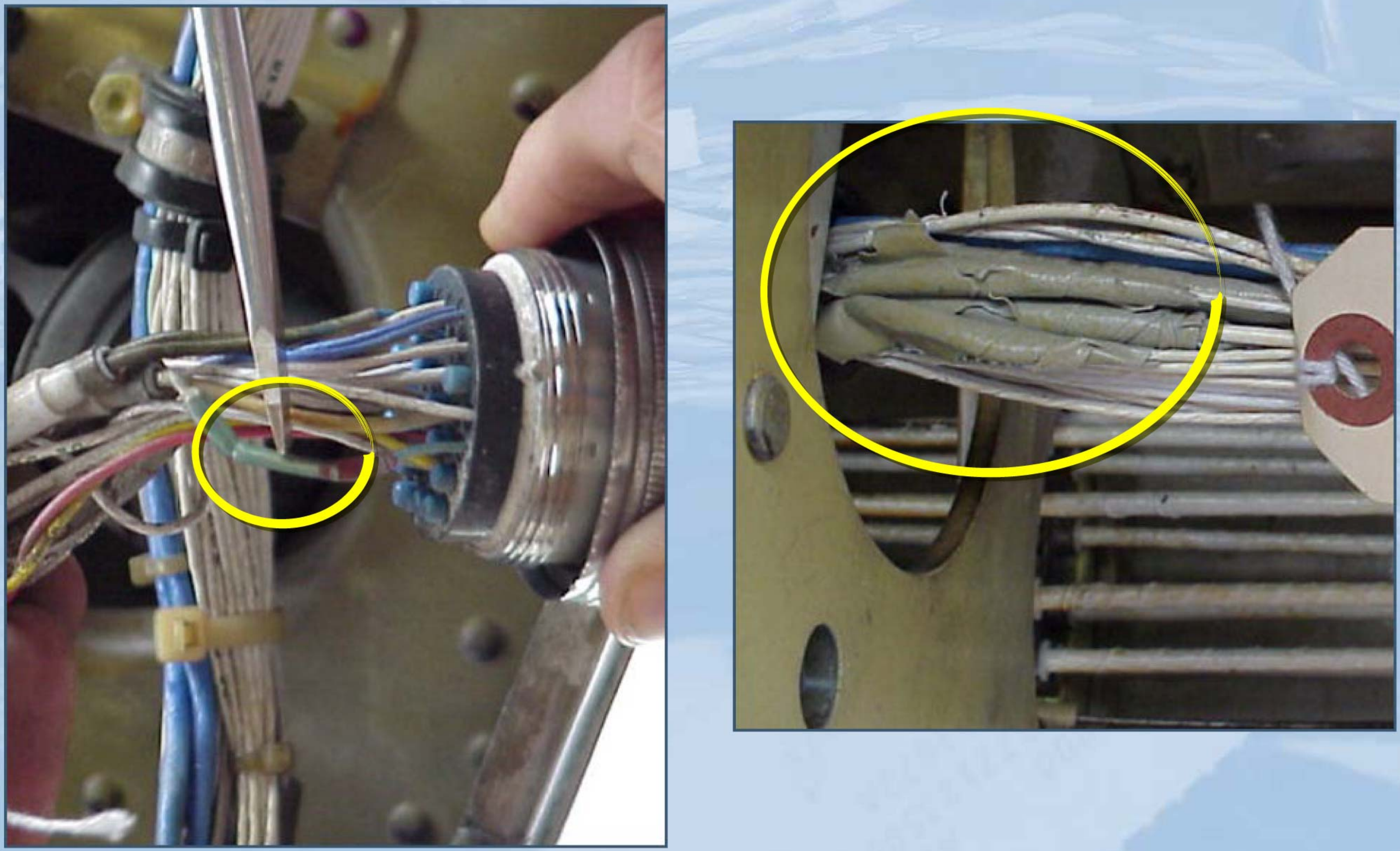

TYPICAL INSULATION DAMAGE

INSULATION QUALITIES

CARBON ARCING

An inappropriate repair may cause irreversible damage in the wire.
The example shown is the consequence of a short circuit.

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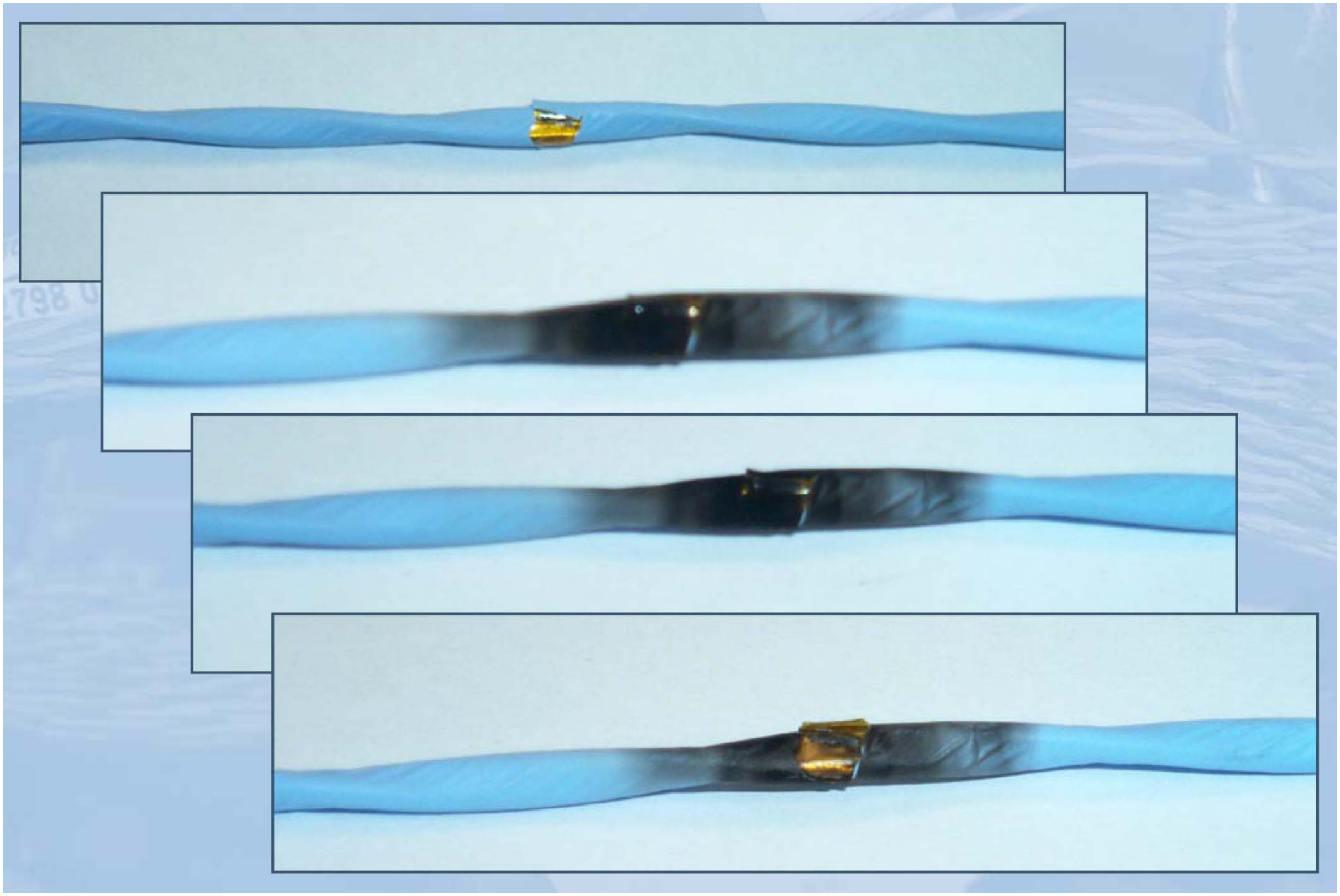

CARBON ARCING

CARBON ARCING

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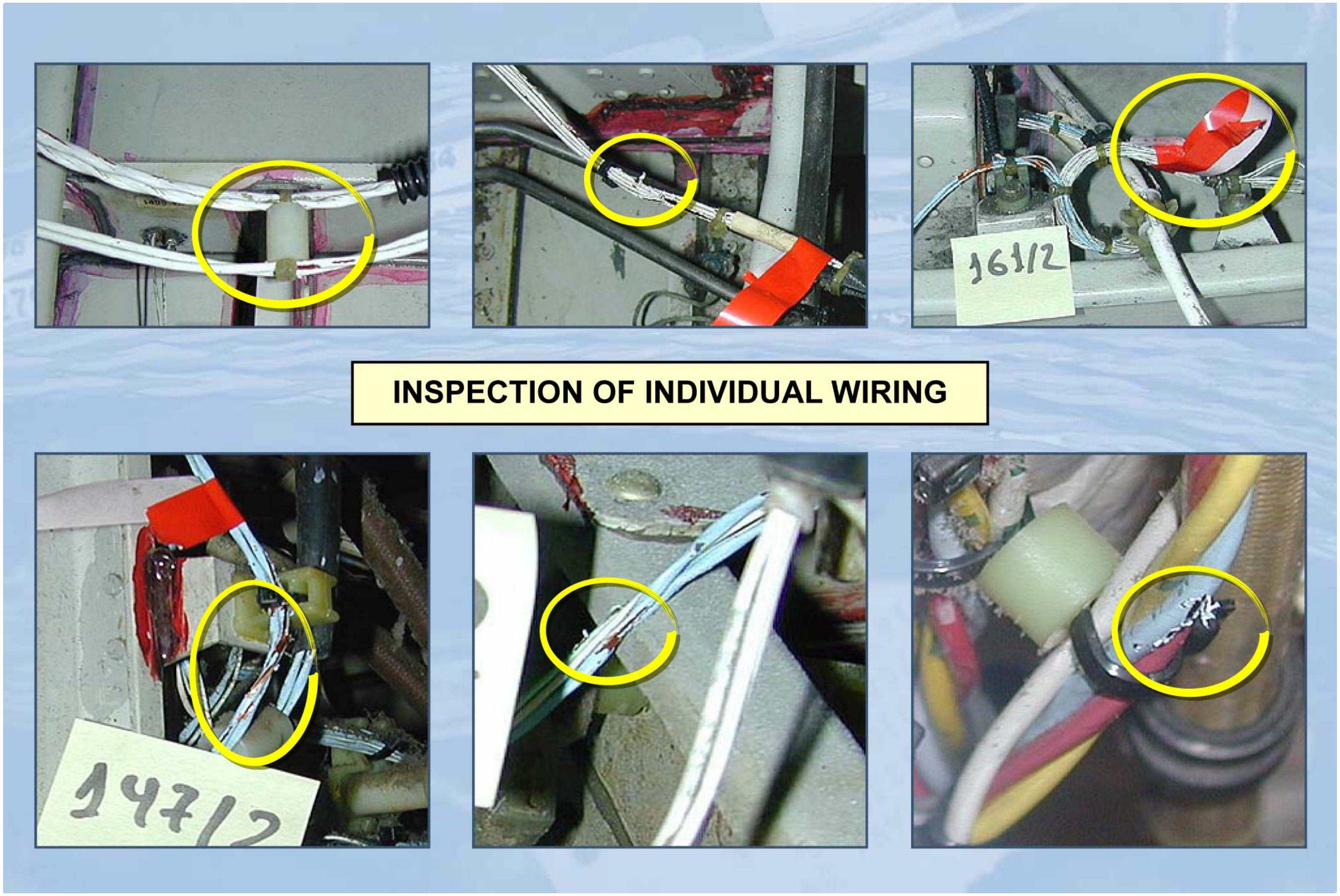
INSPECTION CRITERIA AND STANDARDS OF WIRE AND WIRE BUNDLES

INSPECTION OF INDIVIDUAL WIRING

Inspection of individual wiring
Wiring inspection:
- Wire / wiring fault
- General inspection during C-check

When wire is identified perform:
- Continuity checks.
- Short-circuit detection.

Aircraft wire Continuity test.
ESPM gives the complete procedure.
Short circuit detection.
Example of short circuit
When continuity/short circuit is made on shielded wire, the shielding must be checked as well.
The ESPM checks procedures give you all details on the short circuit procedure.



INSPECTION OF INDIVIDUAL WIRING

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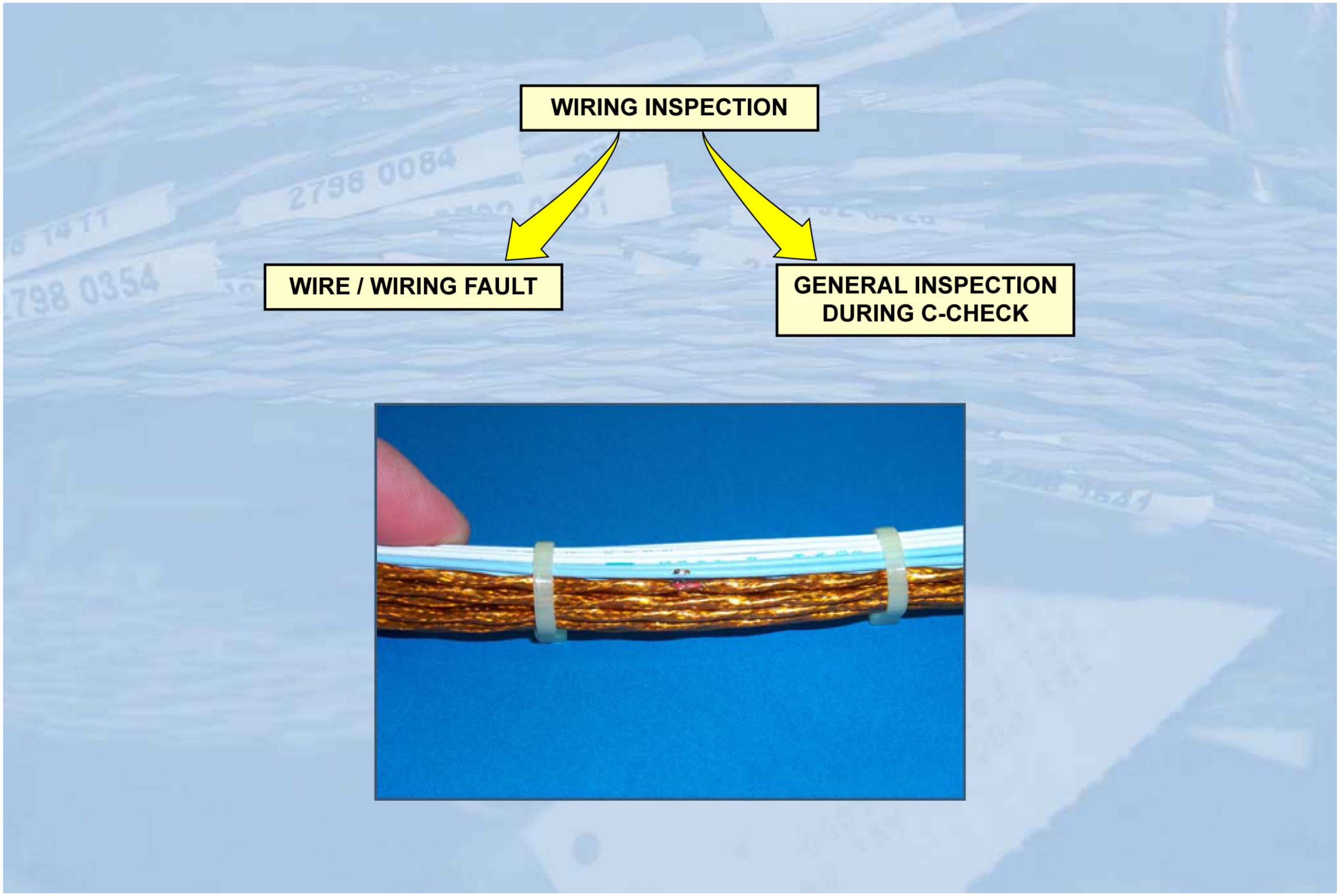

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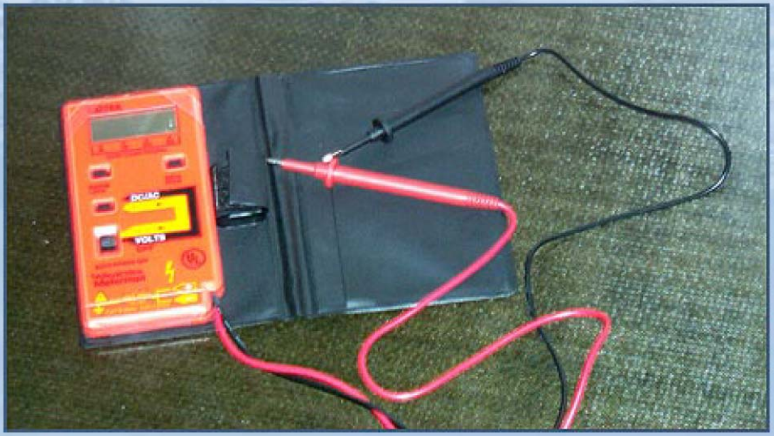

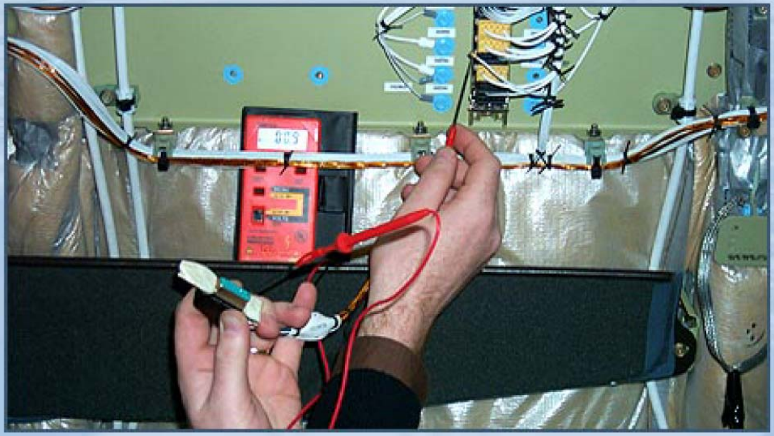

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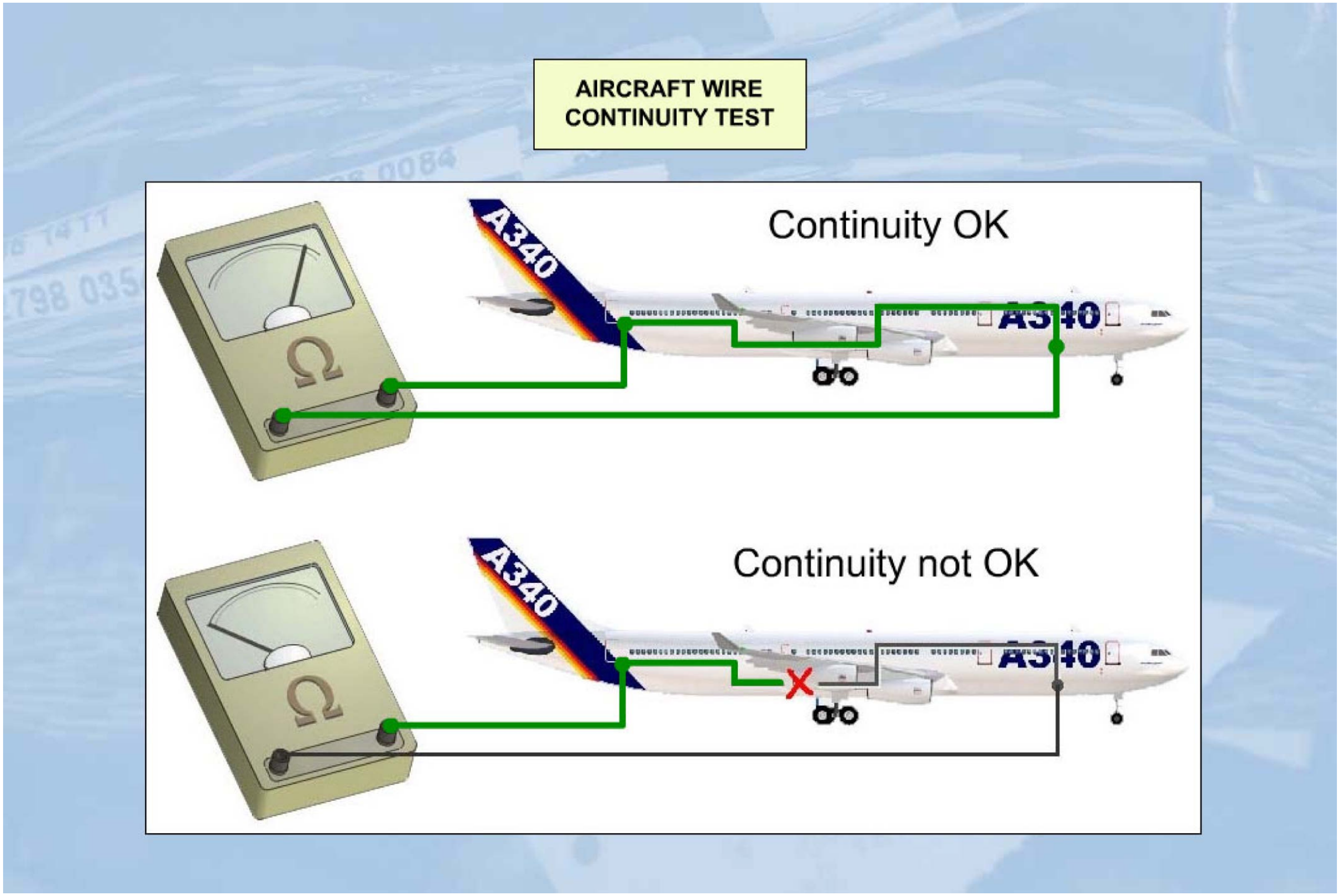

INSPECTION OF INDIVIDUAL WIRING

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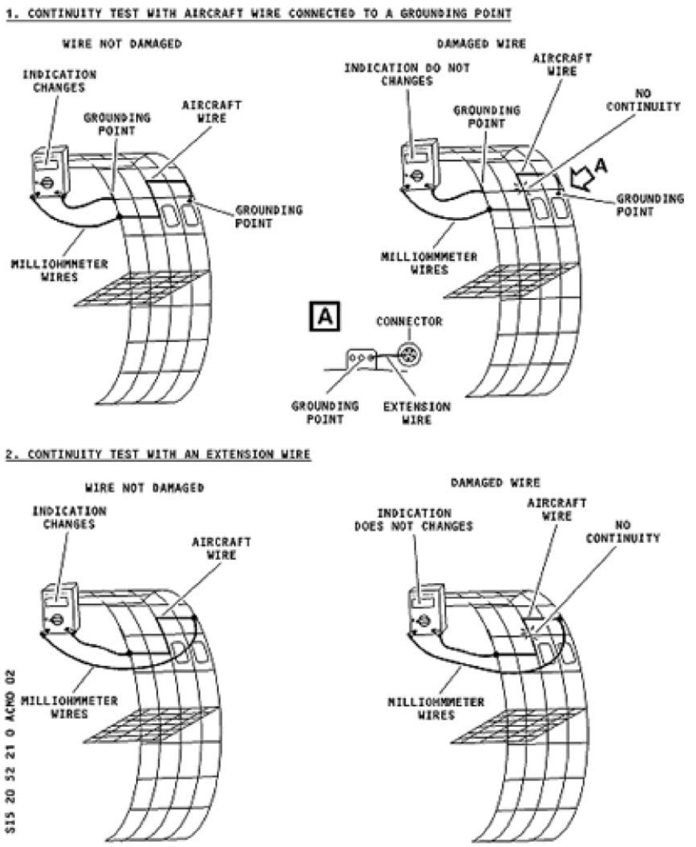

Continuity Test
Figure 002

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INSPECTION OF INDIVIDUAL WIRING

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TEST FOR SHORT CIRCUIT - DESCRIPTION AND OPERATION

1. Reason for the Job

WARNING: FOR TESTS IN THE FUEL TANKS, MAKE SURE THAT YOU USE AN INTRINSIC SAFETY MILLIOHMMETER WHICH:
- AGREES WITH THE LOCAL STANDARDS FOR INTRINSINC SAFETY, AND,
- HAS AN ENERGY OUTPUT THAT IS NOT MORE THAN 0.02 MILLIJOULE.
THIS IS TO PREVENT A RISK OF EXPLOSION.

The following procedure does not replace trouble shooting.
It only gives general test method to be applied on aircraft.

2. Job Set-Up Information

A. Fixture, Tools, Test and Support Equipment

REFERENCE	QTY DESIGNATION
No Specific	Milliohmmeter

NOTE : For a test for a short circuit in the fuel tanks, use an intrinsic safety milliohmmeter (For example: Milliohmmeter CULTON type 278, AVTRON T477W or equivalent)

3. Job Set-Up

A. Milliohmmeter Check

(1) Before you start the test for a short circuit , make sure that the milliohmmeter operates correctly.
(Ref. Fig. 001)

(2) With the two probes in contact adjust the milliohmmeter to show zero Ohm.

B. Voltage and Current Values for the Test.
Use these voltage values:

(1) For circuits with conductors connected directly via standard electrical connections (connectors, modules, etc ...):
- 0.1 A less than or equal to I less than or equal to 2 A with U = 28 VDC max

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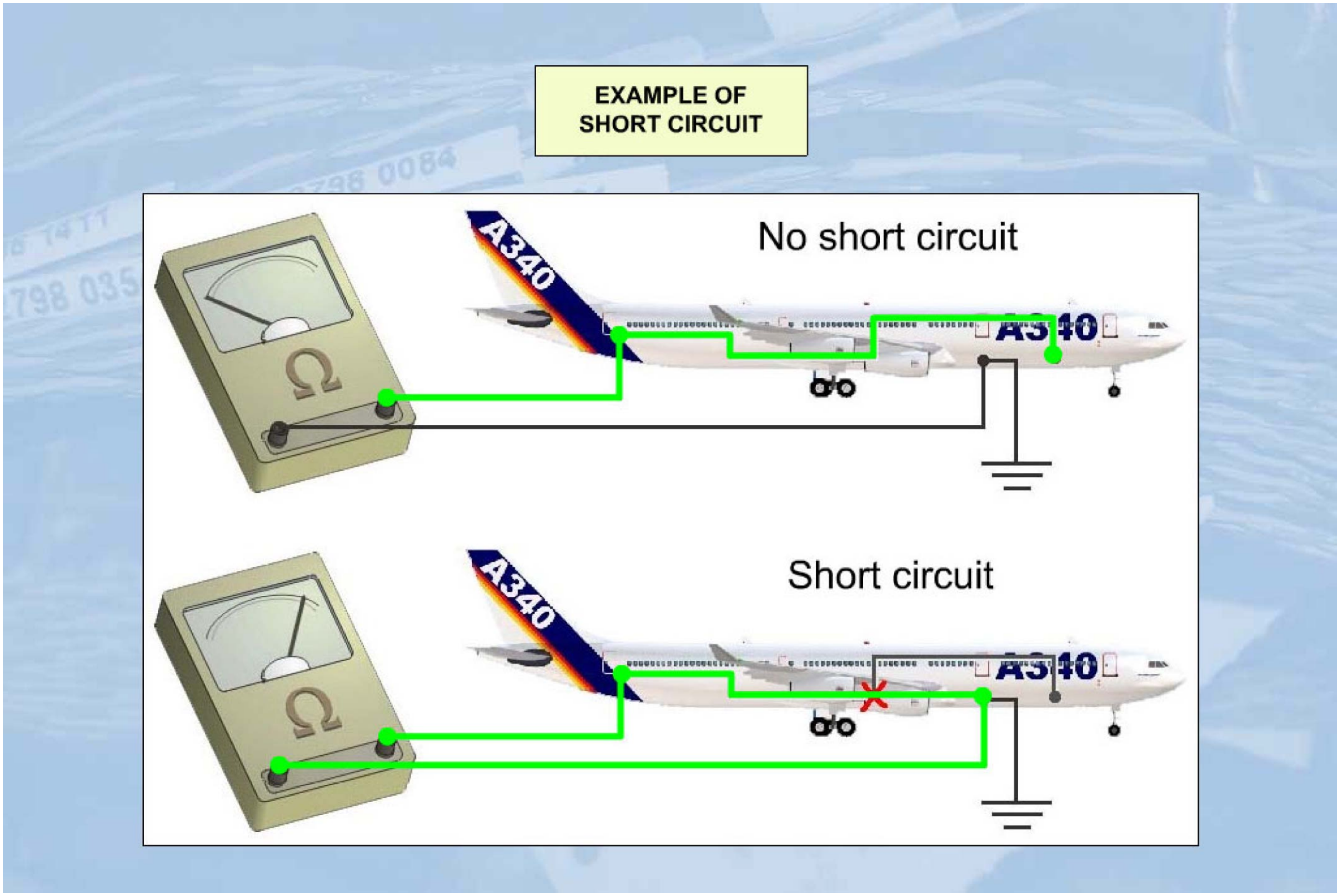

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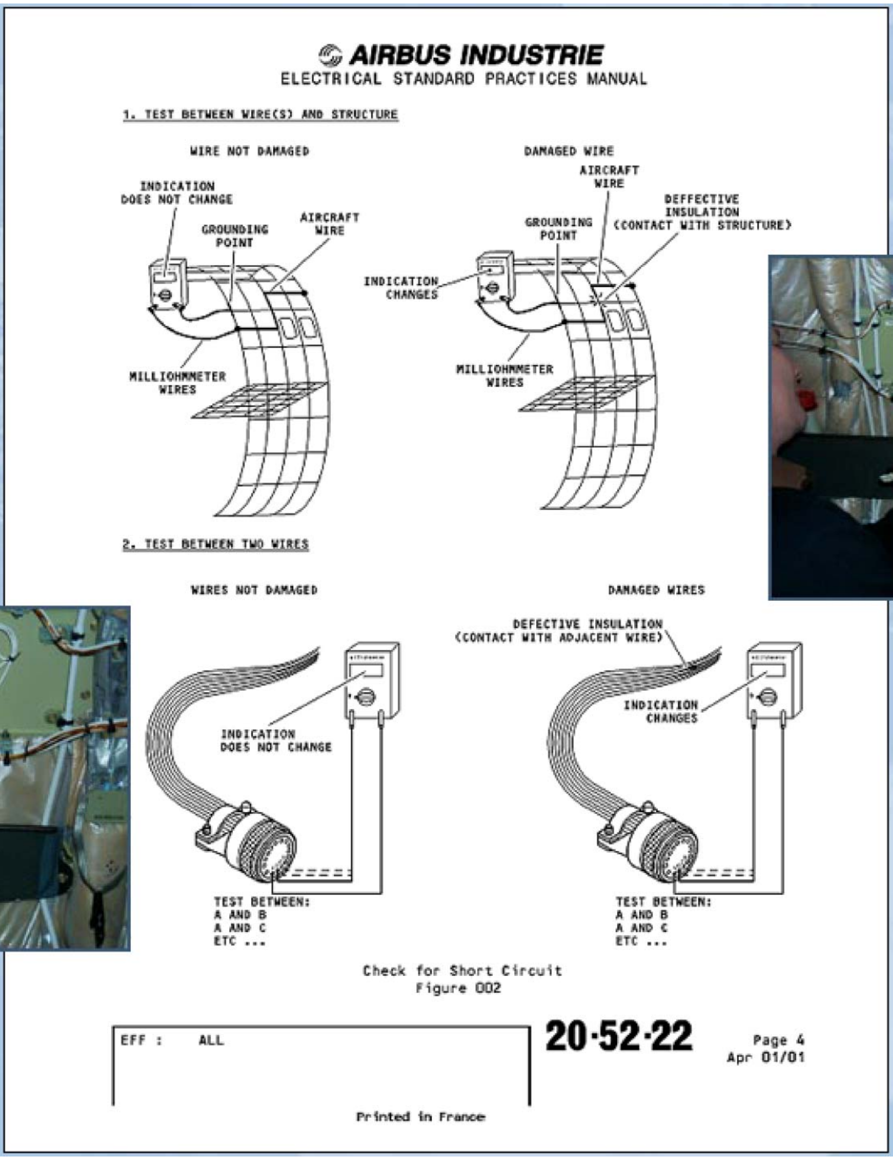

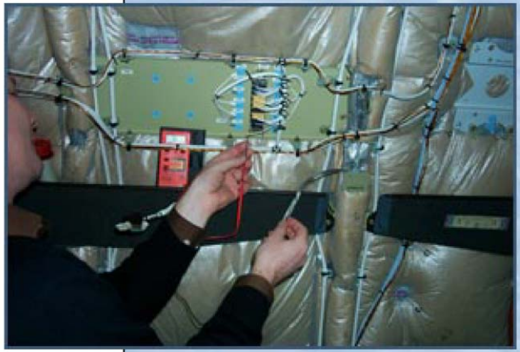

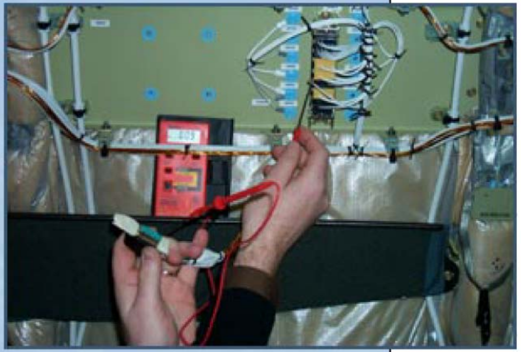

INSPECTION OF INDIVIDUAL WIRING

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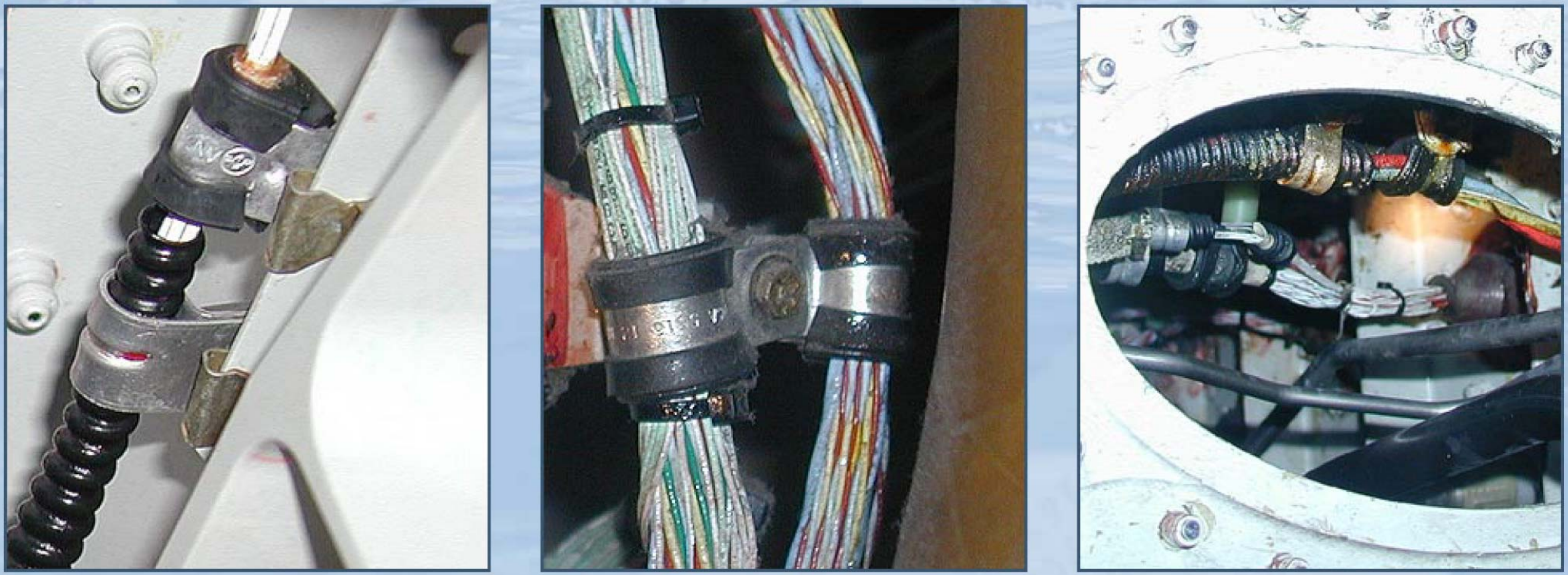
INSPECTION CRITERIA AND STANDARDS OF WIRE AND WIRE BUNDLES

INSPECTION OF WIRE BUNDLES

Inspection of wire bundle.
Check the clamping points.
Wire bundle damaged by:
- Damaged clamp.
- Improper installation.

Check general condition of the bundle.
All the information is located in the ESPM.
Check for ageing installations, example of utilization.
Chemical contamination.
Damage caused by heat.

INSPECTION OF WIRE BUNDLES



INSPECTION OF WIRE BUNDLES

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VISUAL CHECKS - DESCRIPTION AND OPERATION

1. General

This chapter gives the general inspection rules applicable to the different electrical installation components.

2. Procedure

A. Do a visual check of these components.

(1) Wire harnesses

Do a check for:

- contact between the bundles or between the bundles and the structure,
- loose bundles,
- damaged cables,
- missing cable ties and tapes,
- worn or broken cable protection sheaths,
- movement of the sheath end on the support component,
- missing or damaged grommets.

(2) Connectors

Do a check for:

- corrosion on shells,
- damaged grommets,
- incorrect retention of the cables at the backshells (broken tail),
- cushion missing on backshell,
- cable tie missing on backshell,
- incorrect installation of backshell,
- broken foolproofing chains,
- missing lockwire,
- deformation of pins

B. Do a visual check of connector locking

(1) Circular connectors

(a) Bayonet locking

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INSPECTION OF WIRE BUNDLES

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INSPECTION OF WIRE BUNDLES

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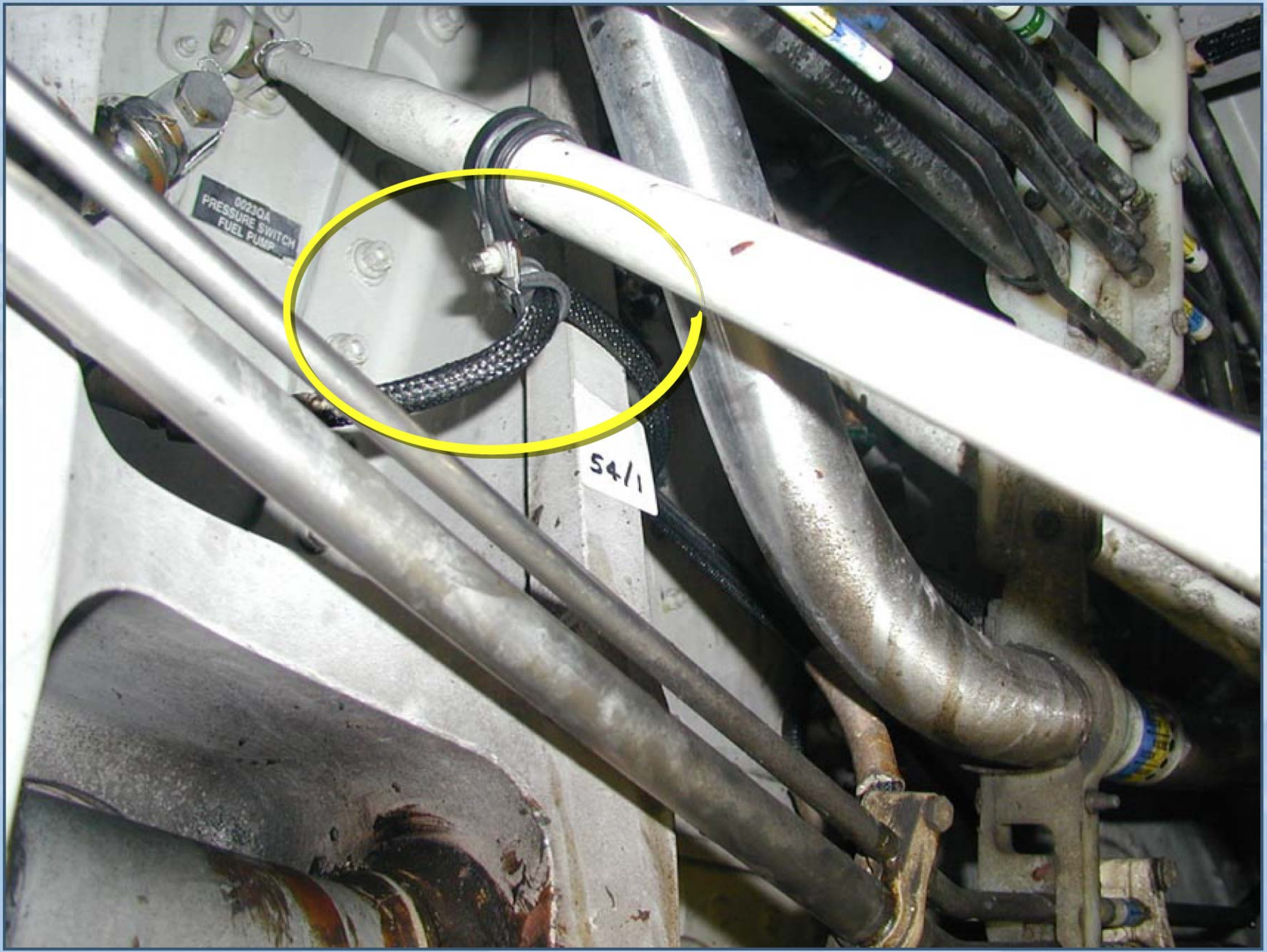
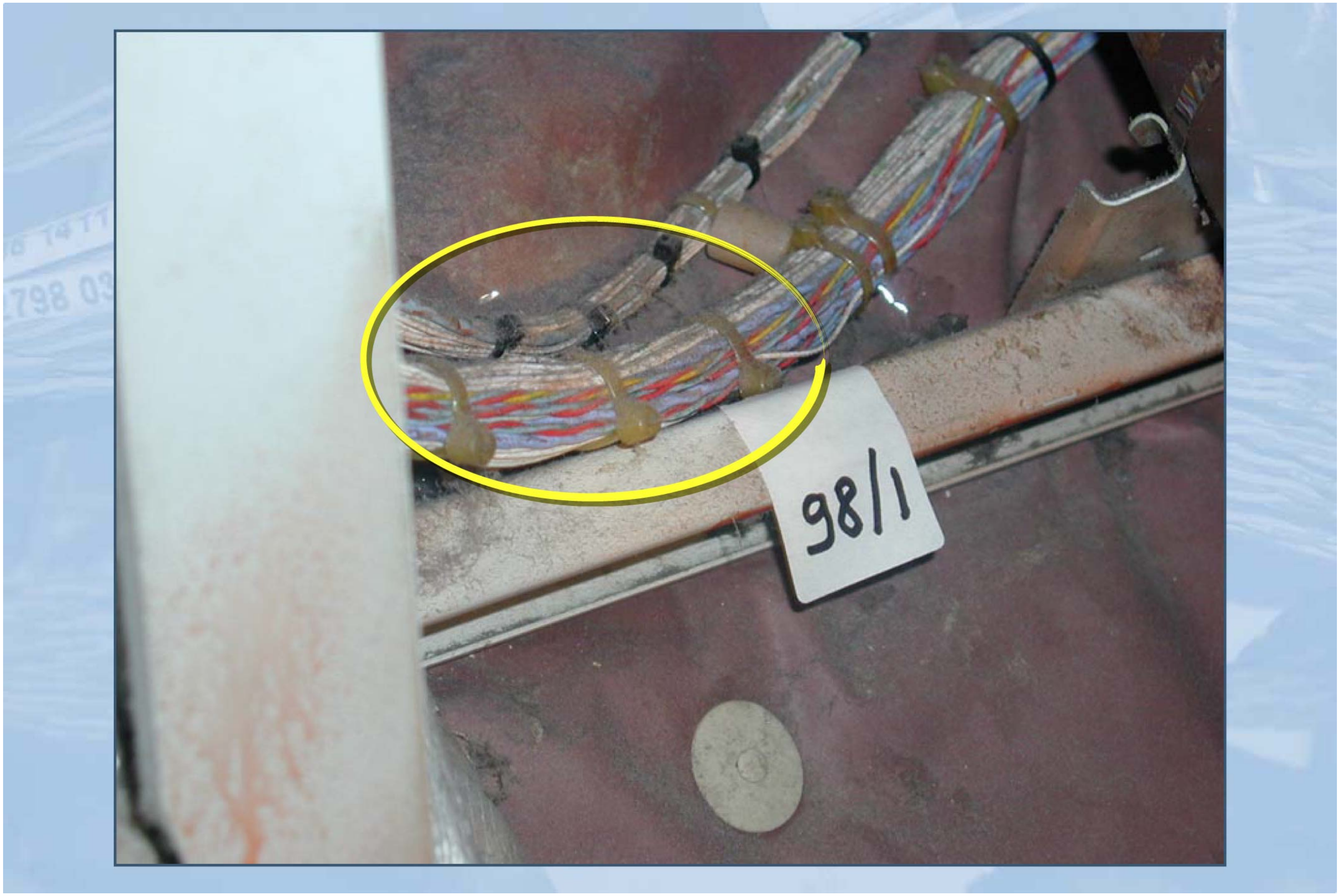


INSPECTION OF WIRE BUNDLES



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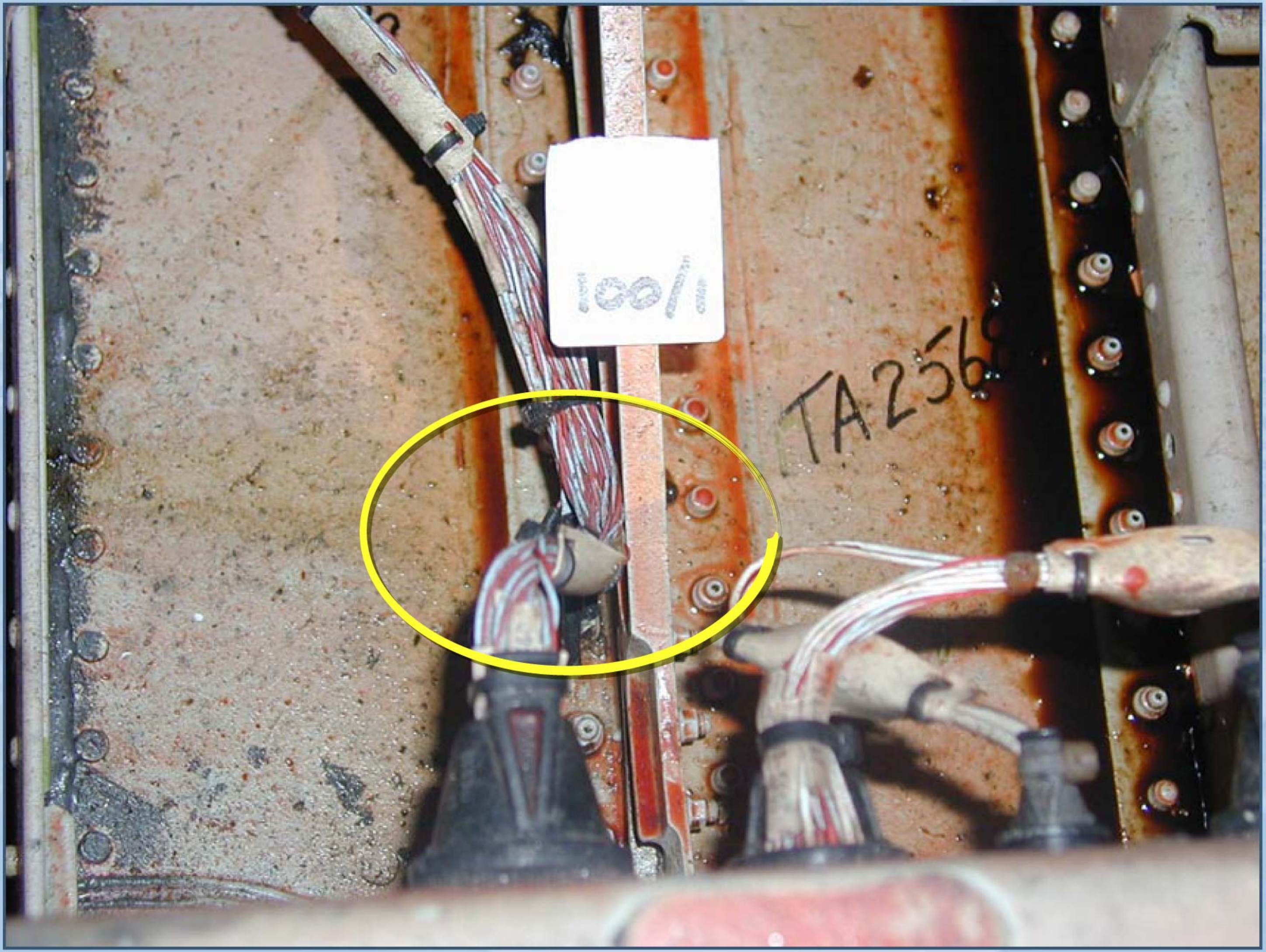

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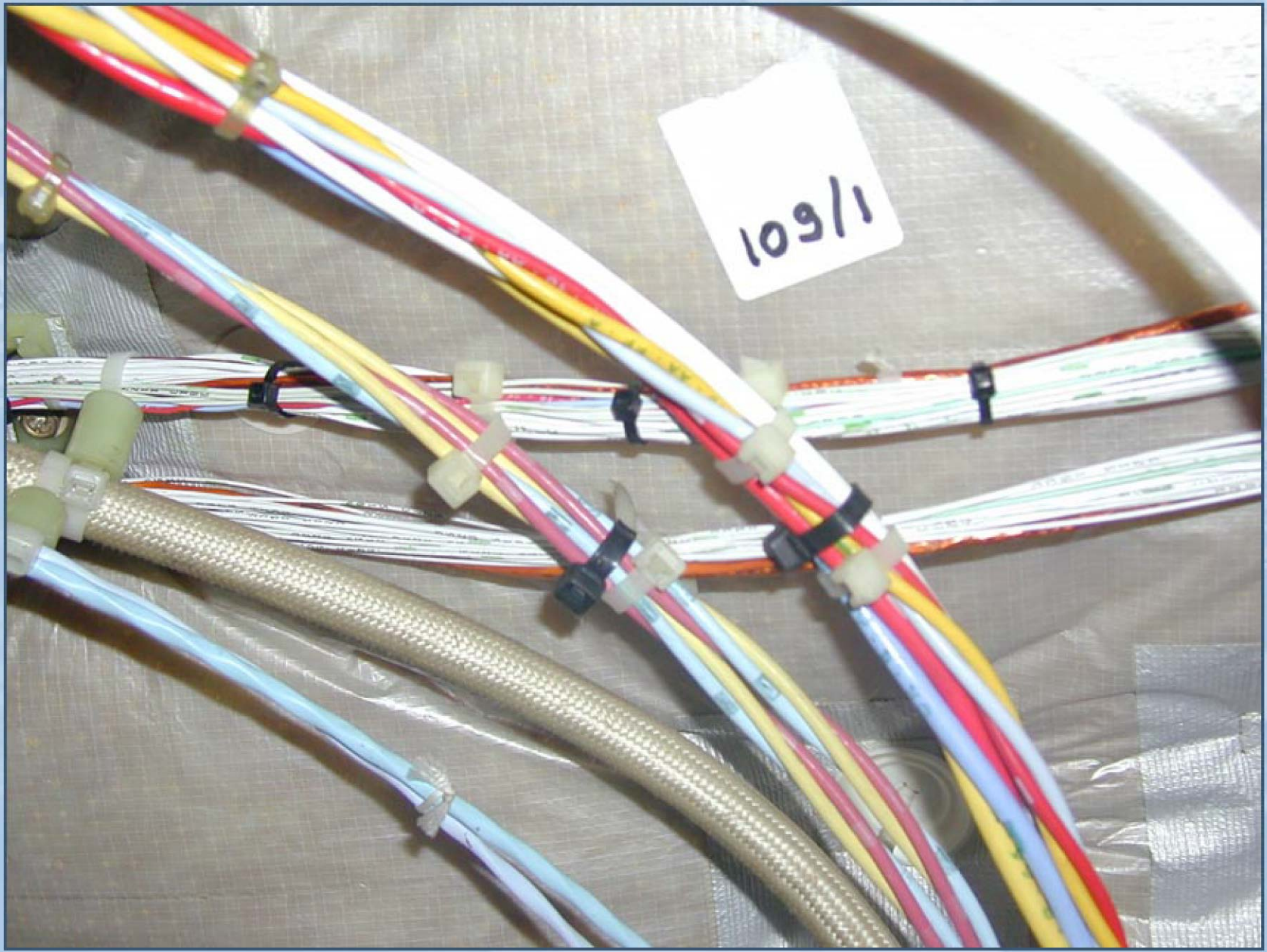

INSPECTION OF WIRE BUNDLES

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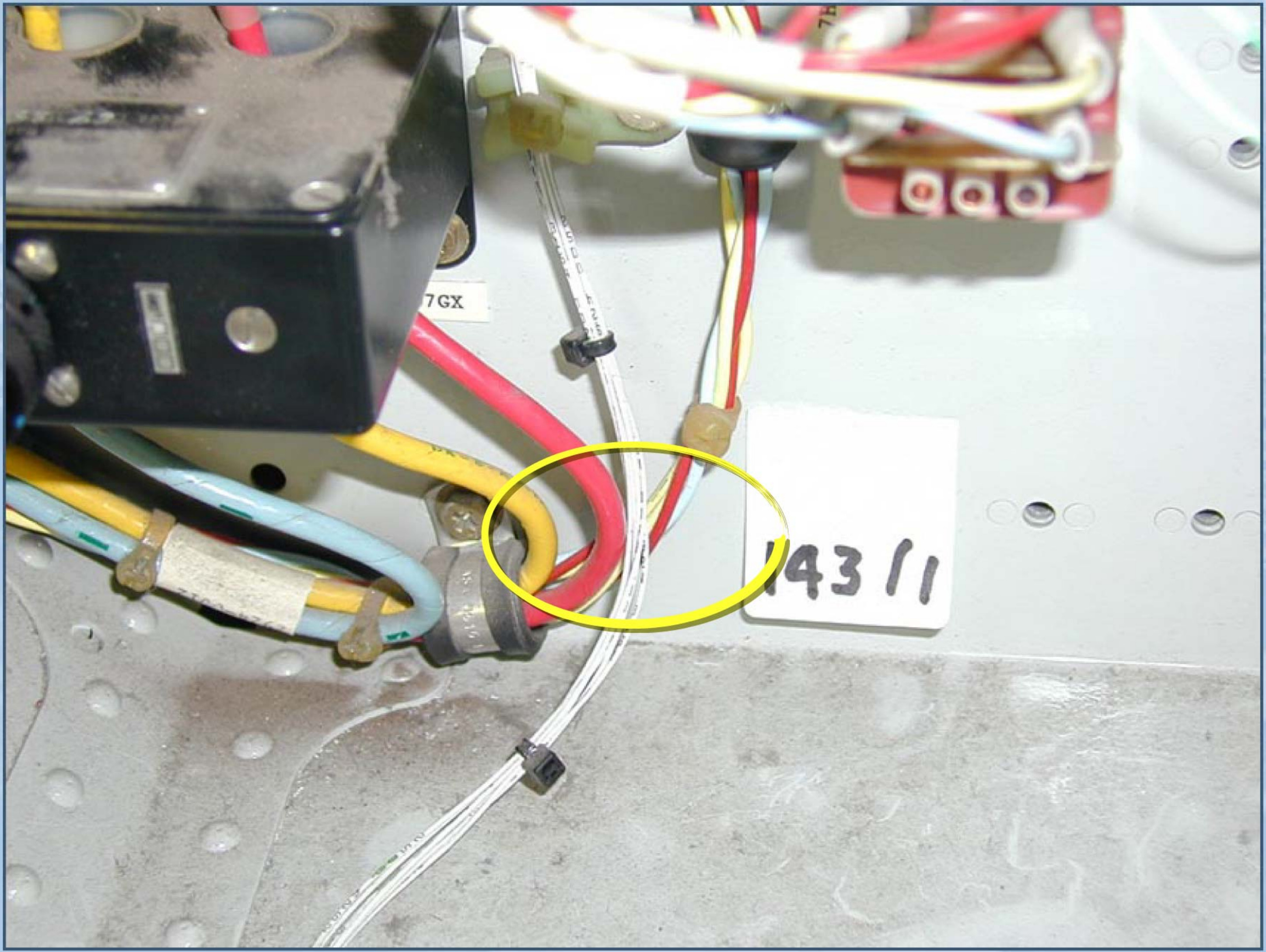

INSPECTION OF WIRE BUNDLES

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
MANUAL CHECKS - DESCRIPTION AND OPERATION

1. General
This chapter gives the general inspection checks applicable to the different electrical installation components.

2. Checks
Do a manual check of these components.

A. Bundle attachment

(1) V-supports
Make sure that the size of the support is correct
- if the support is too large, add glass tape ASNA5107 on the periphery of the bundle (2 turns minimum)
- if the support is too small, add a bushing NSA5539 or a round bar (dia. 1.5 mm (0.0590 in.) or 3 mm (0.1181 in.), 20 mm (0.7874 in.) length) at the bottom part of the support.

(2) Clamps
Make sure that the bundle (or the convoluted conduit) does not move in the clamp when you apply a light force to the bundle.

If the bundle moves:
- remove the clamp,
- install a smaller diameter clamp or add glass tape ASNA5107 on the bundle.

If the convoluted conduit moves:
- remove the clamp,
- add glass tape on the conduit,
- install a smaller clamp.

B. Loss of segregation
This can occur when there is extra length on the cable.

(1) EFCS (if installed) or engine parallel routes
Measure the distance between the two routes. The distance must be 25 mm (0.9842 in.) or more at all locations; this includes areas where there is cable deflection.

If the distance is less than 25 mm (0.9842 in.):
- distribute the extra length along the harness, or
- use a sleeve ABS0596 on one of the two routes, attached with cable ties NSA935401 at level of the non-conformity.
(Ref. Fig. 001)

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ELECTRICAL STANDARD PRACTICES MANUAL
CHECK FOR AGEING - DESCRIPTION AND OPERATION

1. General
This chapter gives general inspections of the electrical installation to find (and repair) possible deterioration because of ageing.

2. Bundle Sagging

A. Description of wire bundle sagging
Bundle sagging is an increase in the length of bundle between two adjacent attachments that causes the bundle to hang down too much.
Sagging occurs when the bundle gradually moves from its initial trajectory because of slippage at its attachments.
When this movement starts, it usually gets faster with time.
Sagging can cause:
- Possible loss of segregation,
- Wire damage because of chafing between the bundle and the adjacent structure and/or equipment and/or wiring,
- Drip loops to become straight,
- Too much tension in the bundle between attachments or at connectors.

B. How to find bundle sagging on the aircraft.
Note: Cable bundles usually hang down a little between adjacent attachments. This is not an incorrect condition and action is necessary only if the bundle moves from its initial trajectory and hangs down too much between two adjacent attachments.
To find sagging, look for these conditions:
- A bundle that hangs down too much between two adjacent attachments (Ref.20-52-12),
- No more segregation between bundles (Ref.20-52-12),
- Risk of chafing between the bundle and the adjacent structure and/or equipment and/or wiring (Ref.20-52-12),
- Missing drip loops/bundle pulled straight.
(Ref. Fig. 001)
Note: The increased lenght between the attachments can come from:
- Drip loops,
- Stowed bundle,
- Play in the bundle at other locations.

C. Repair Procedure
Do a check of the bundle installation upstream and downstream of the sagging to find the location(s) where there is too much tension or reduced length.
(Ref. Fig. 001)

CAUTION: TEMPORARILY SUPPORT AND/OR INSTALL PROTECTION FOR THE BUNDLE WHEN YOU REMOVE BUNDLE ATTACHMENTS TO PREVENT DAMAGE TO THE BUNDLE.

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INSPECTION OF WIRE BUNDLES

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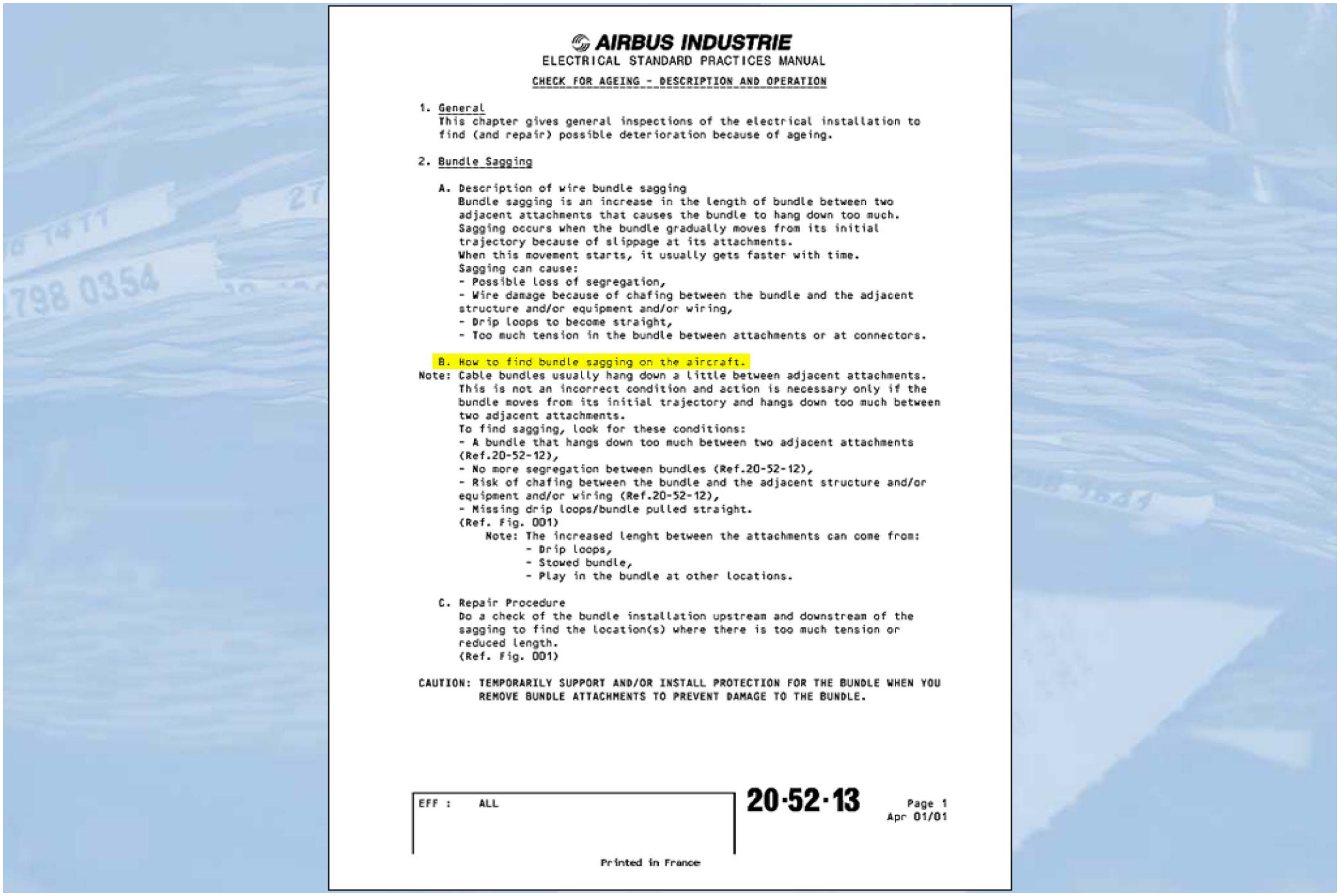

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INSPECTION OF WIRE BUNDLES

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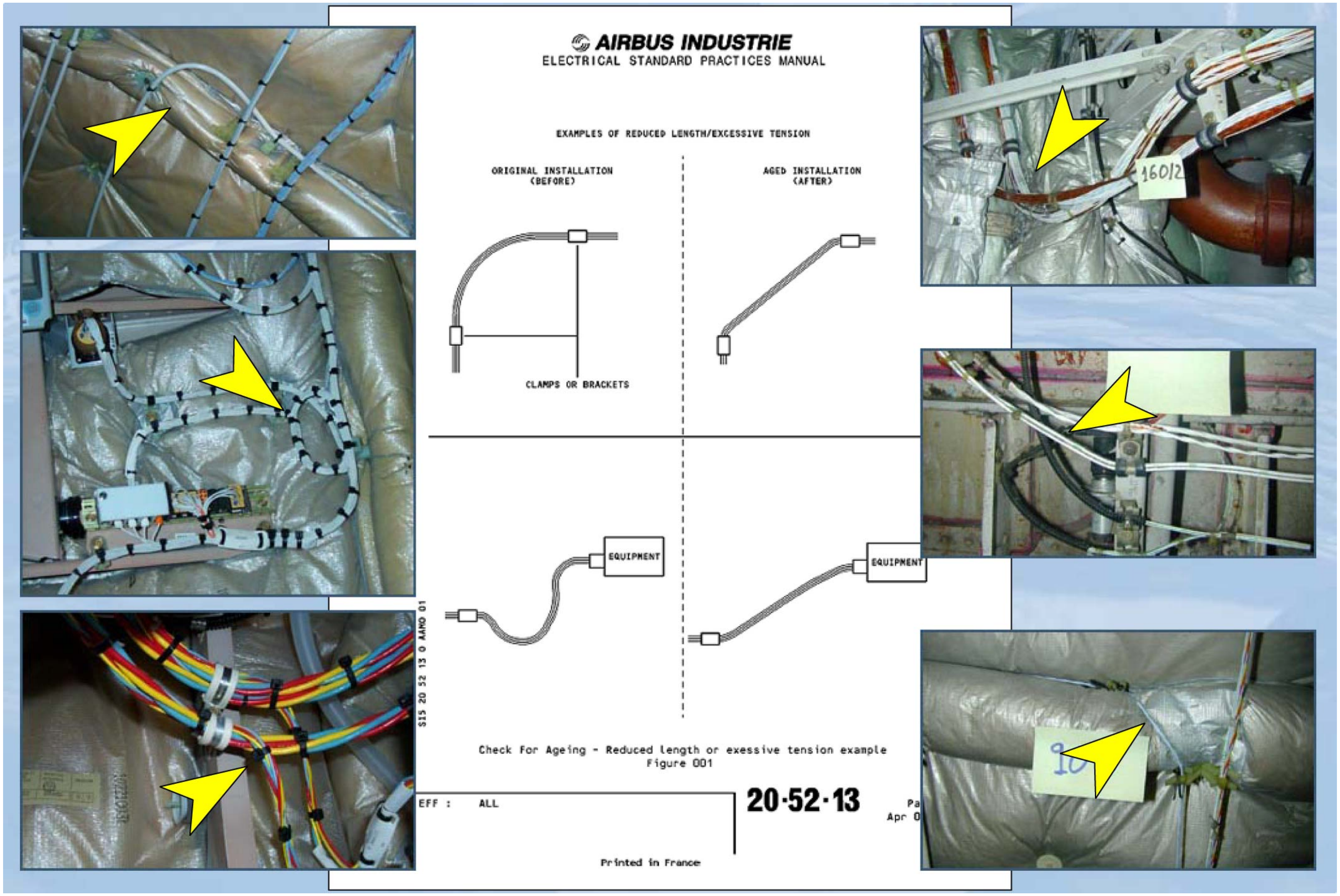

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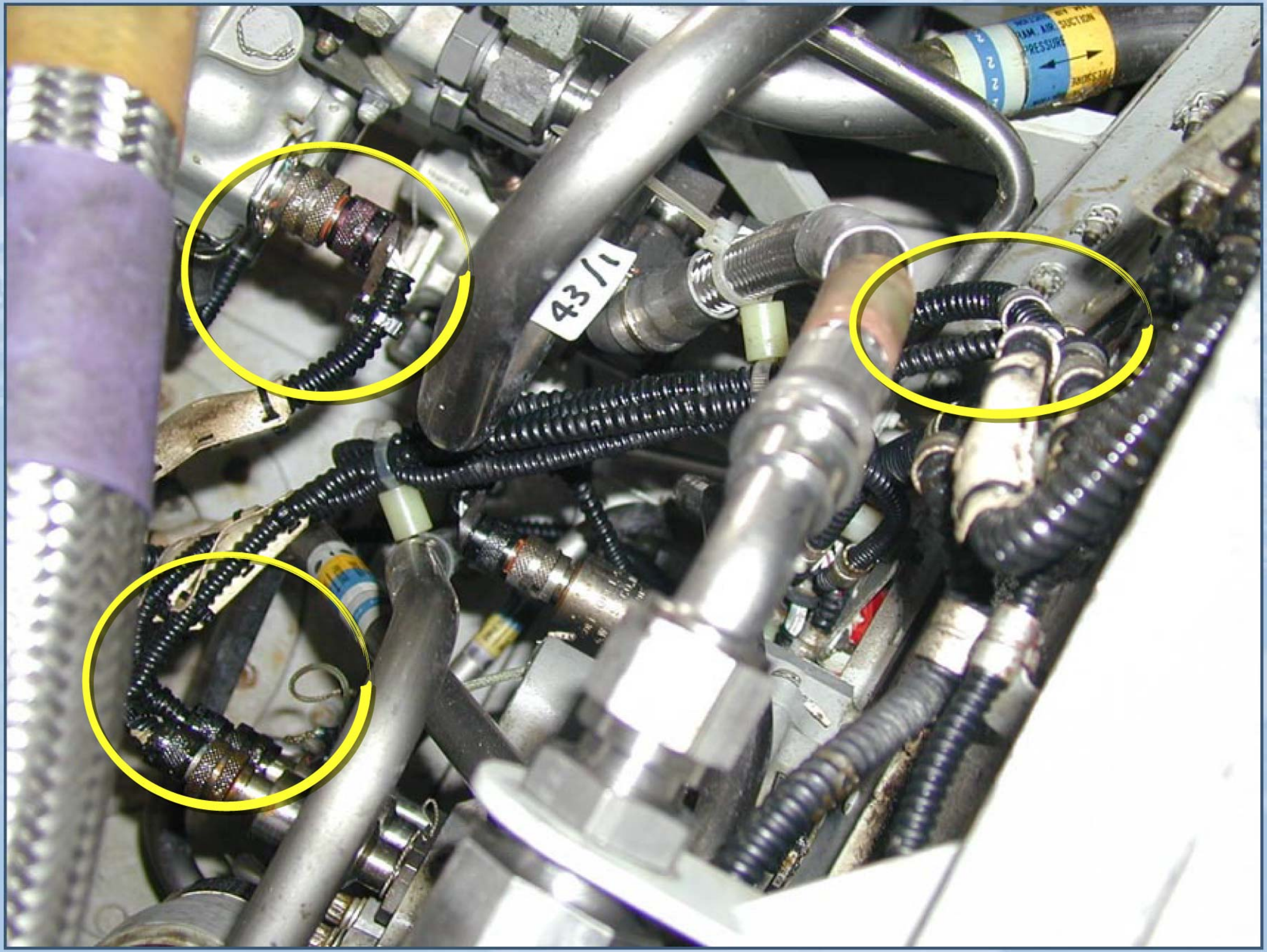

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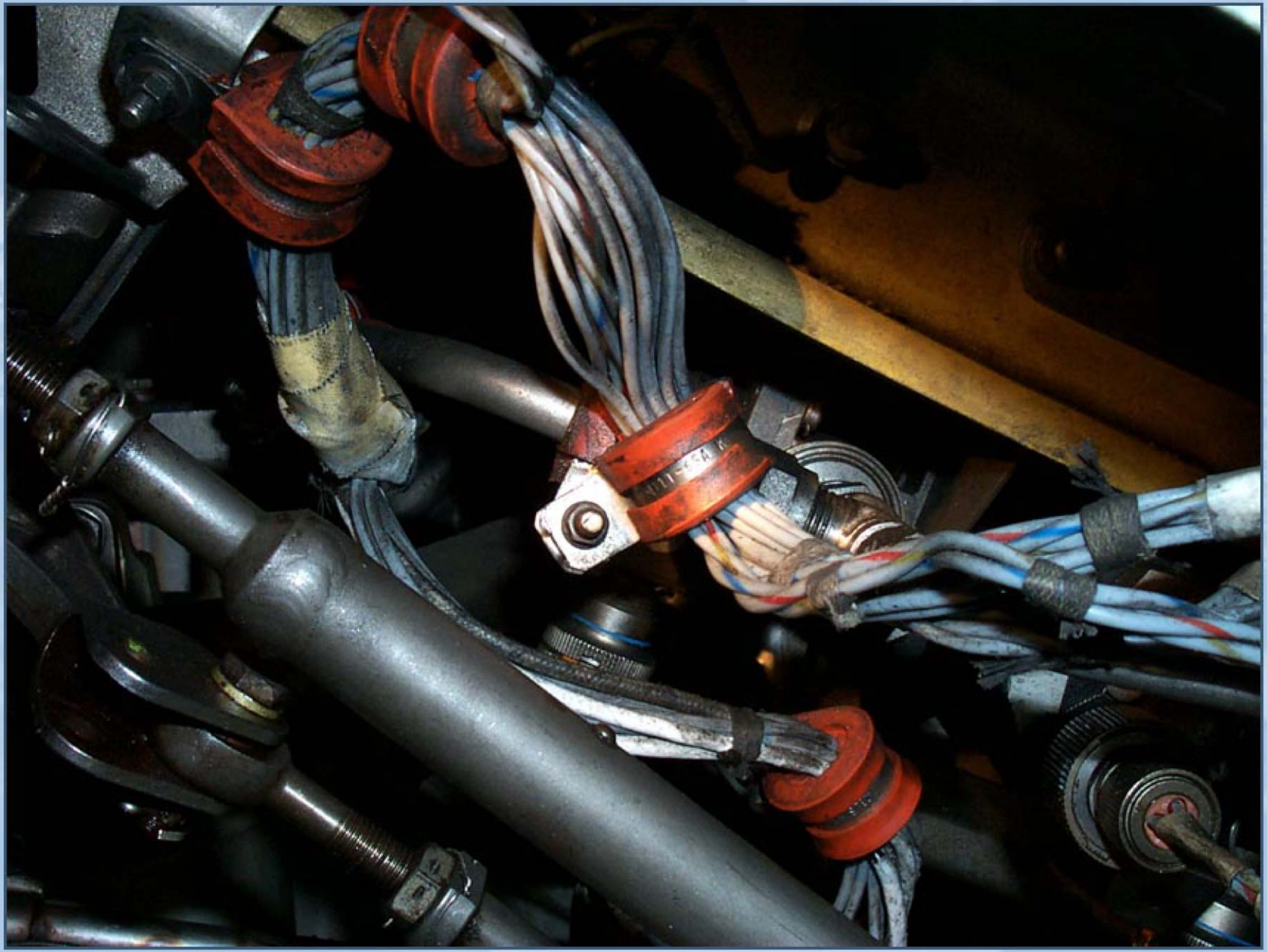

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INSPECTION OF WIRE BUNDLES

X8U08481 - X0332T0 - XM2025000000001

WIRE BUNDLE INSTALLATION PRACTICES

ROUTING

ROUTING

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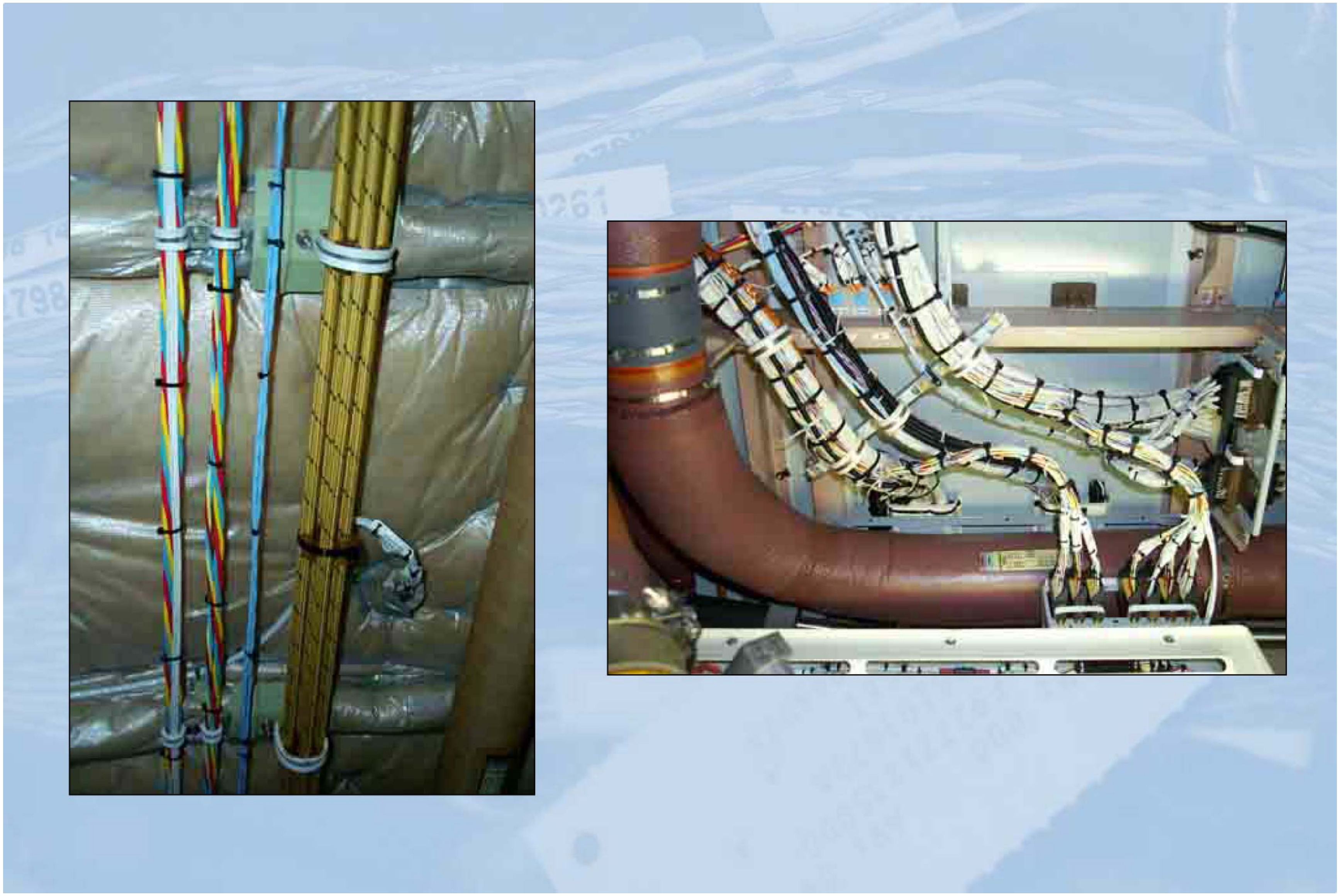
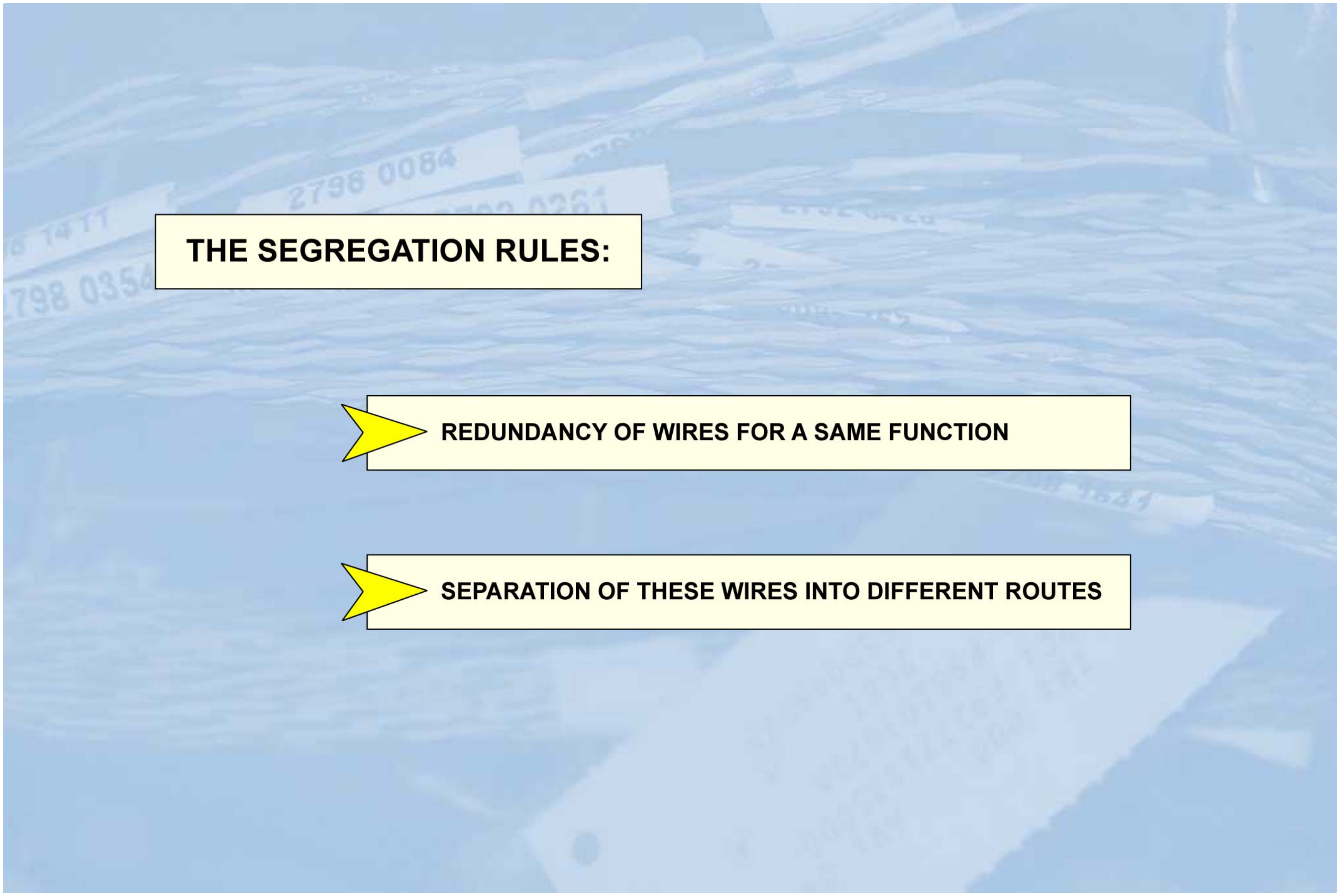


ROUTING

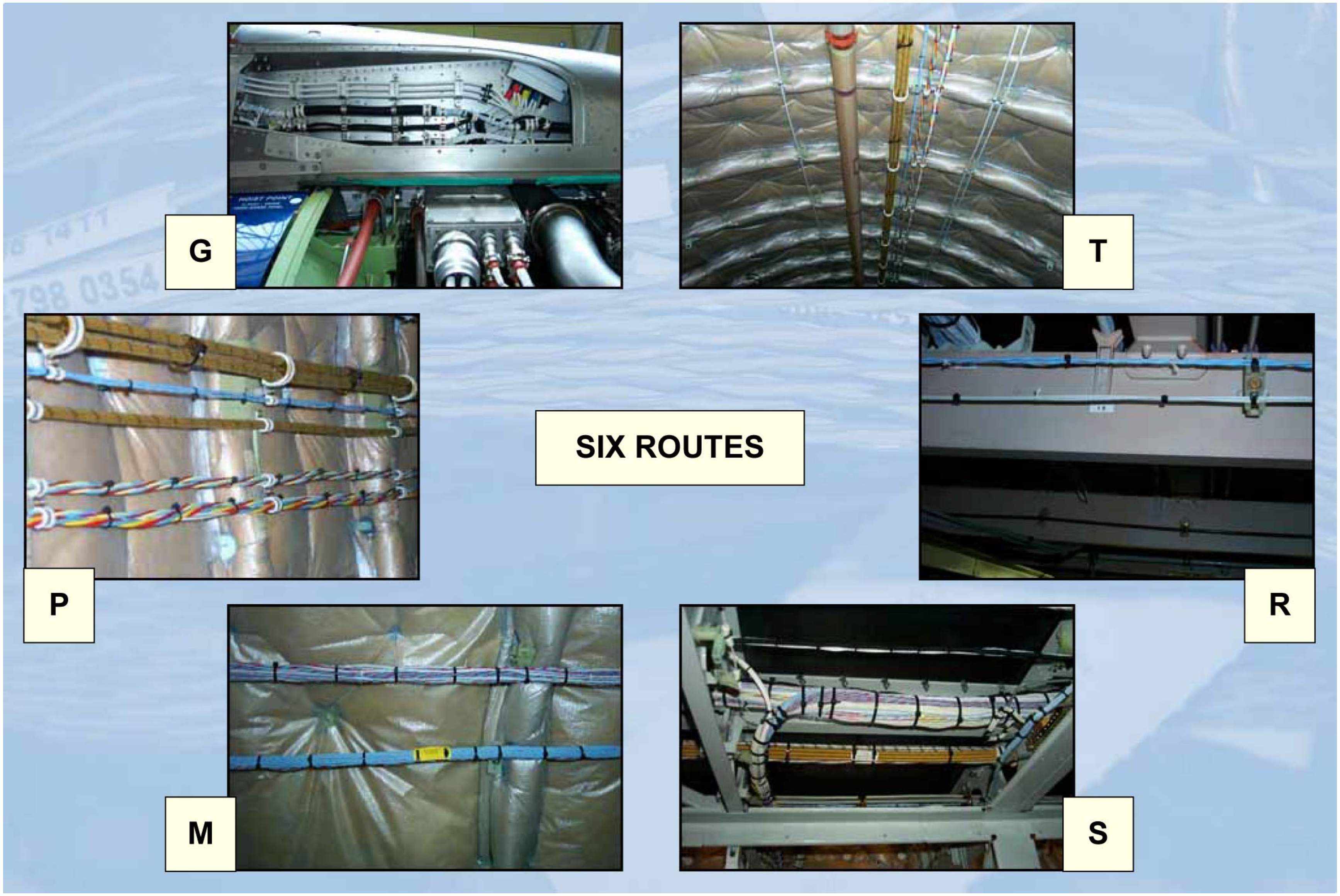
WIRE BUNDLE INSTALLATION PRACTICES

SEGREGATION RULES

The segregation rules:
 Redundancy of wires for a same function,
 Separation of these wires into different routes.
Six routes
ROUTE -G (GENERATION)
ROUTE -P (POWER DISTRIBUTION)



SEGREGATION RULES



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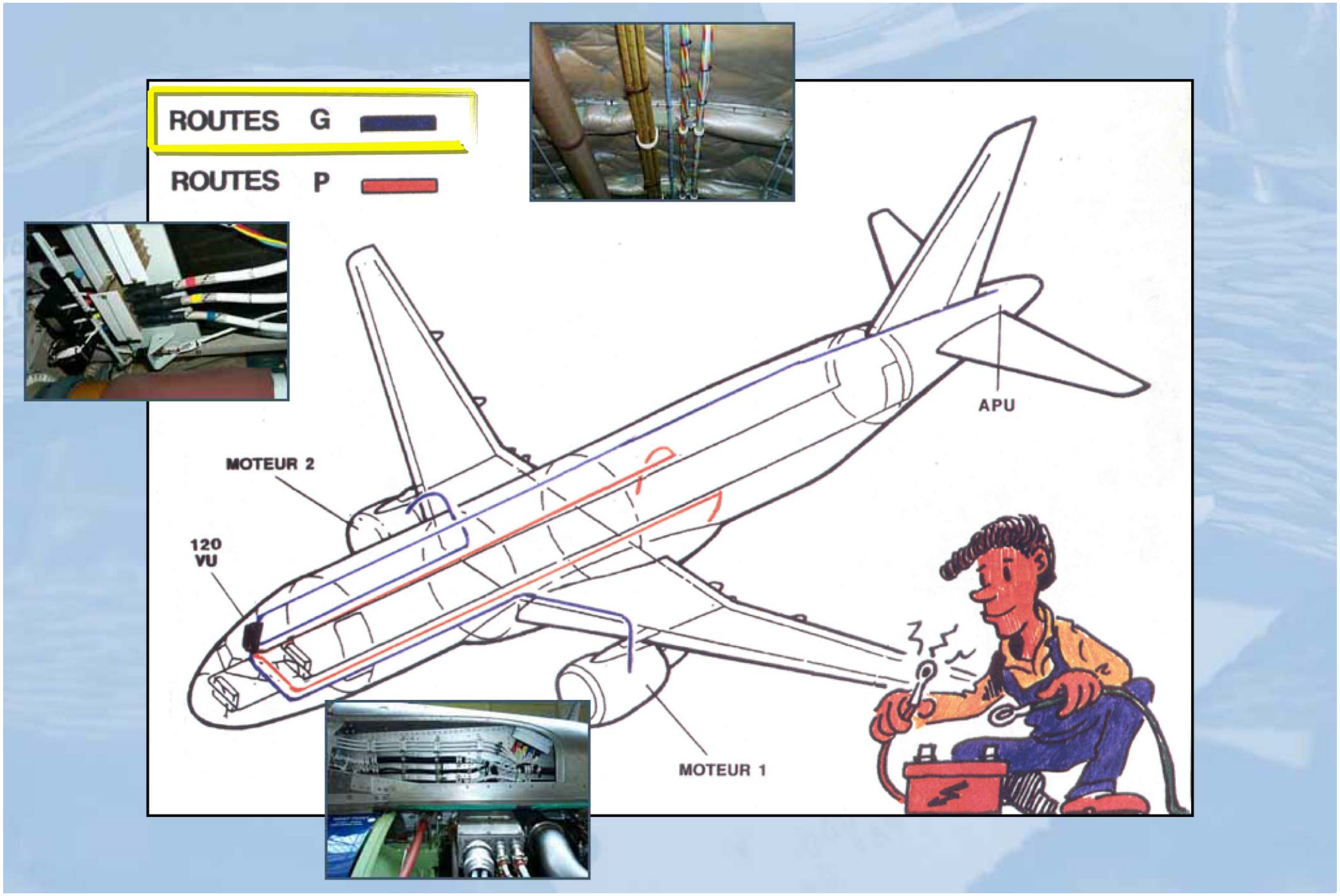

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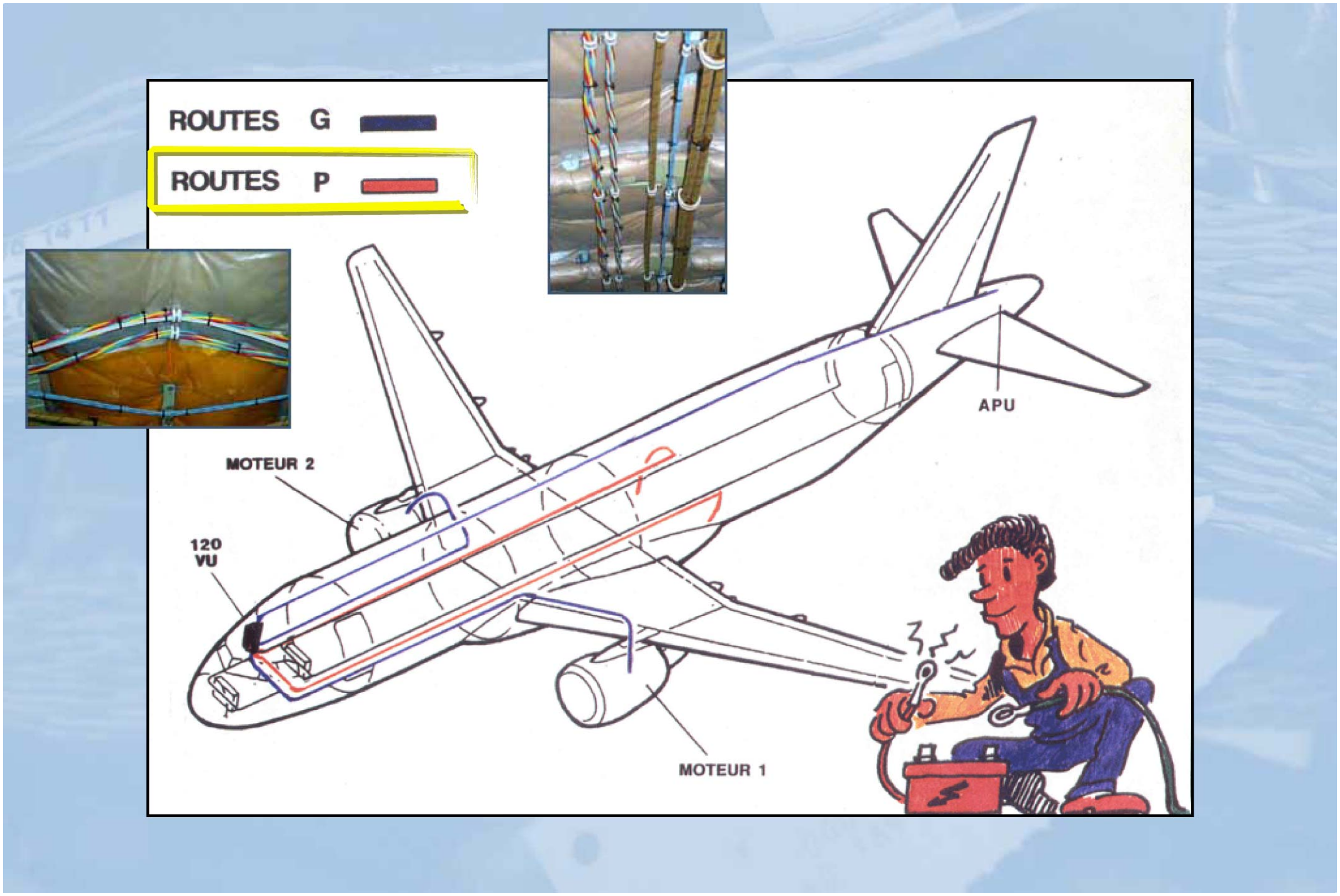

SEGREGATION RULES

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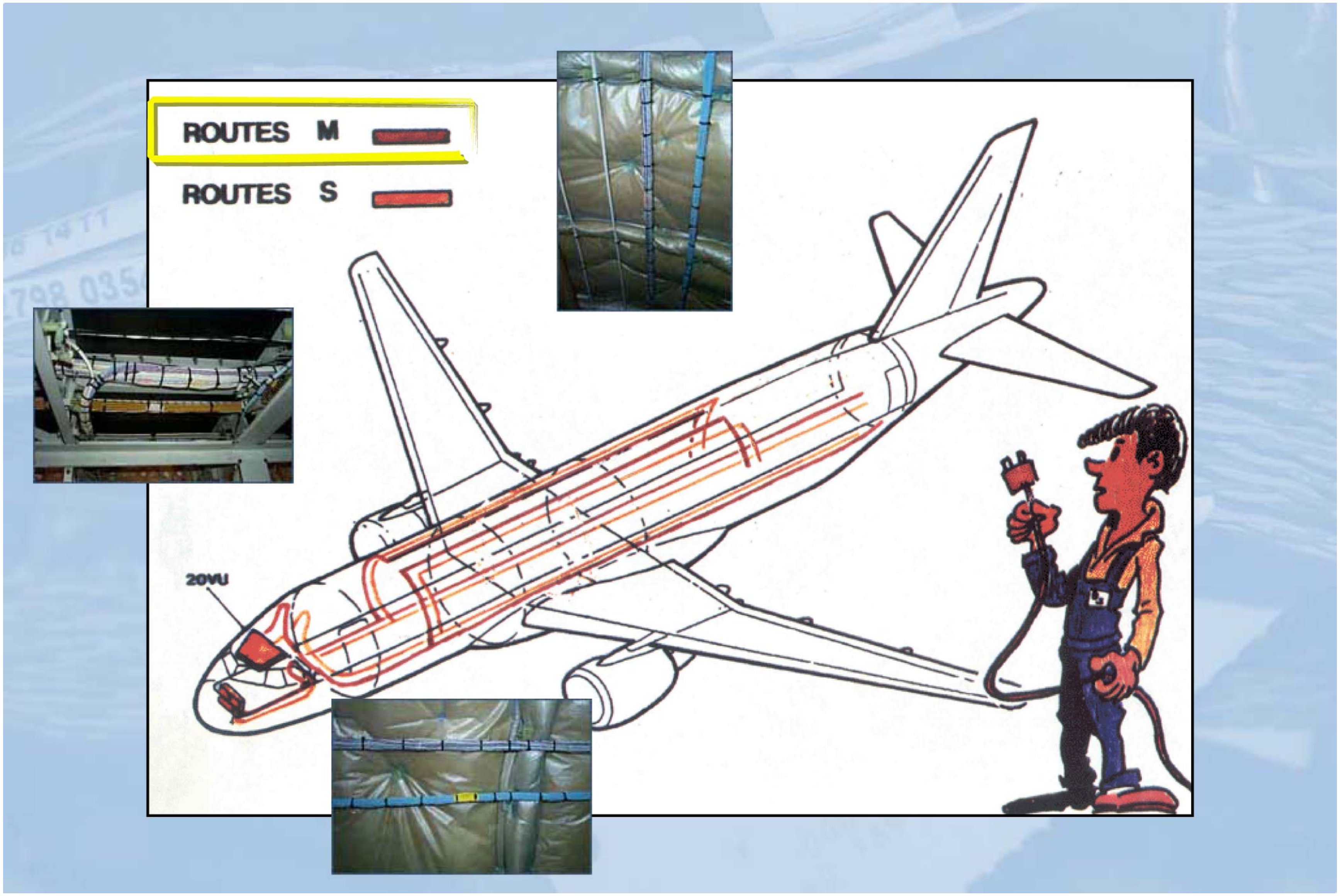
WIRE BUNDLE INSTALLATION PRACTICES

SEGREGATION

ROUTE-M (MISCELLANEOUS)
It includes passive wires, which do not necessitate special separation requirements. Example: non-sensitive cables.
ROUTE-S (SENSITIVE WIRES)
Further information is available in the ESPM
ROUTE-R (AUDIO WIRES)
ROUTE-T (COAXIAL CABLES)
Why a redundancy and separated routes philosophy?
Two routes of the same category, example 1M and 2M, which contain duplicated systems, are as far apart as possible.



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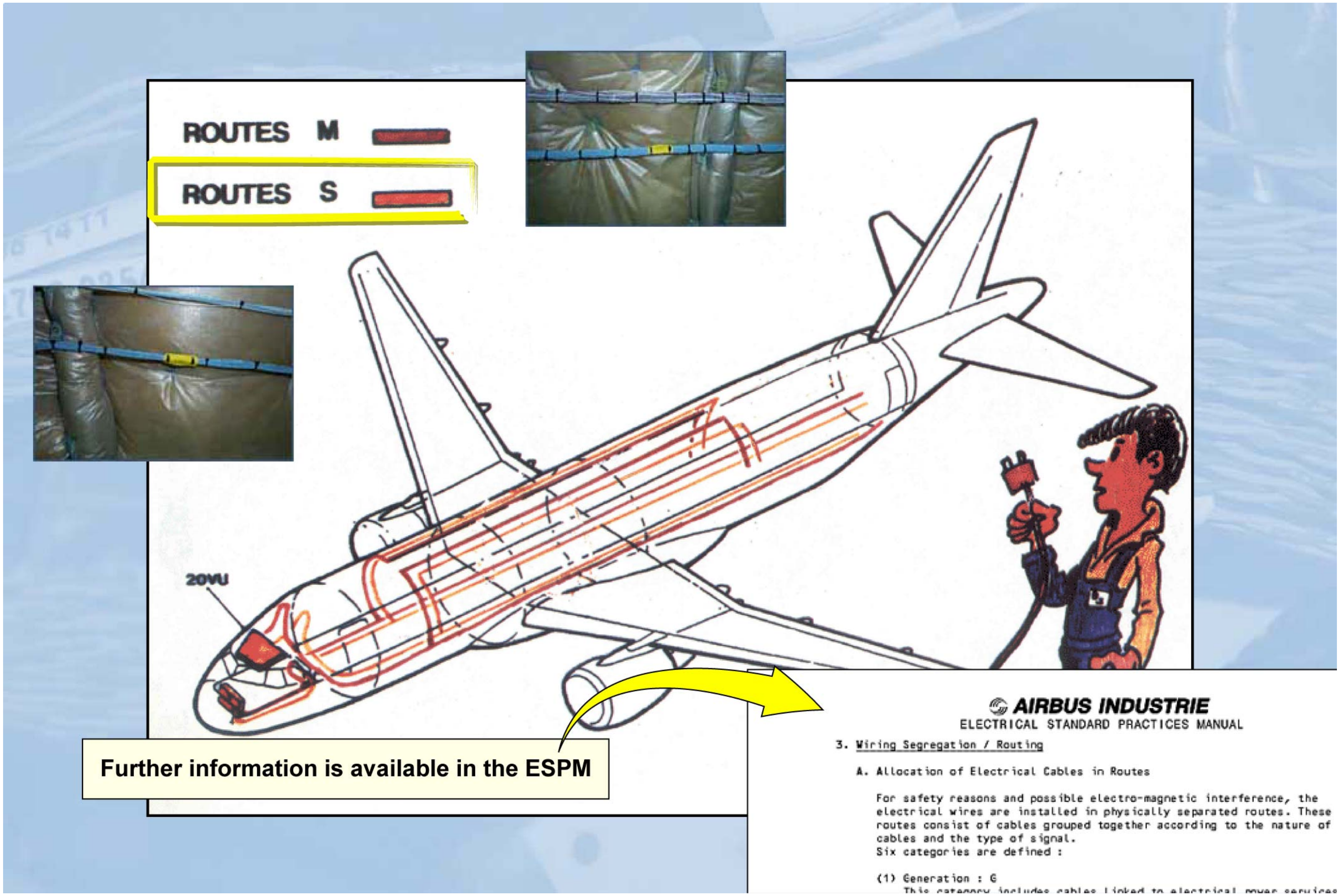

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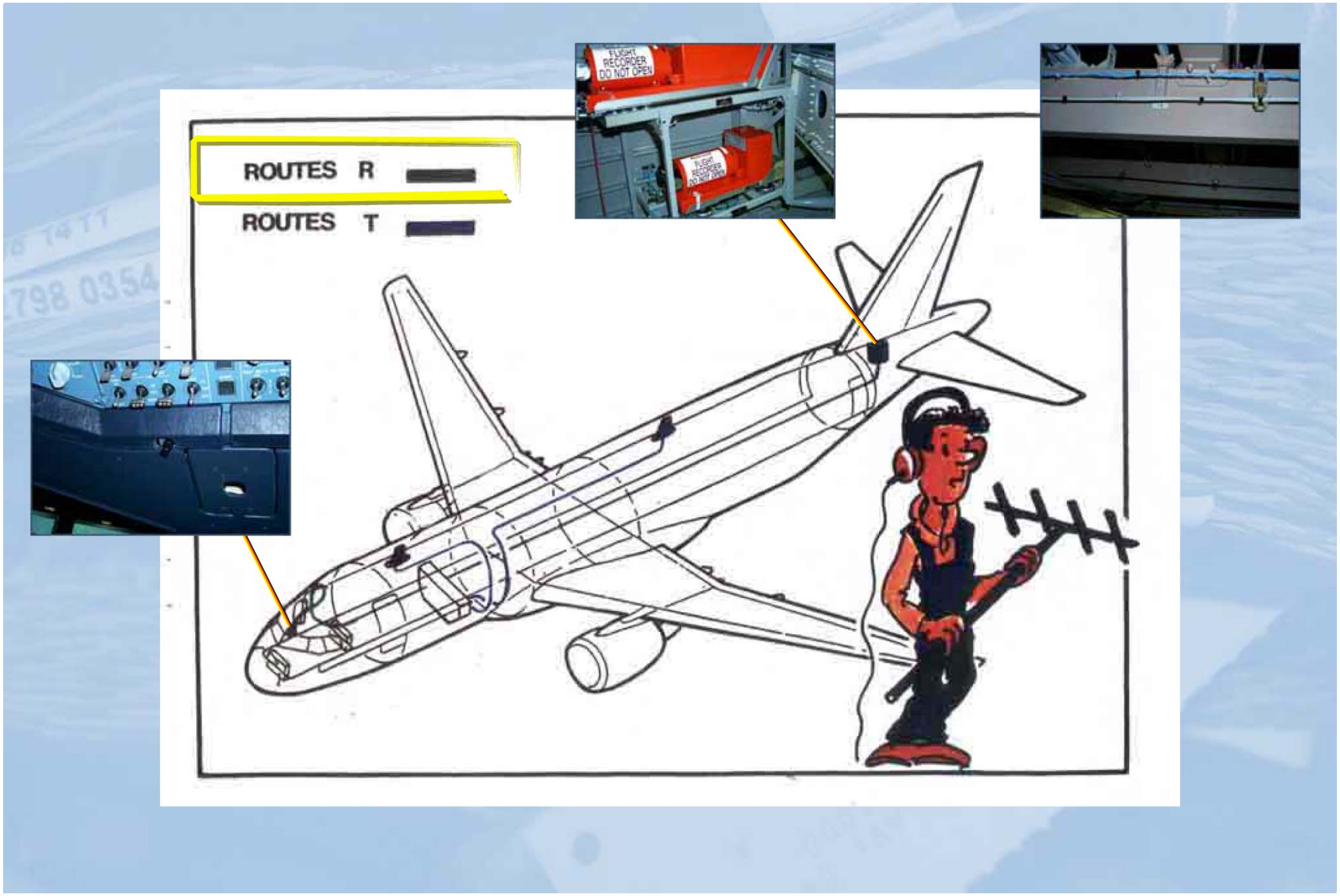

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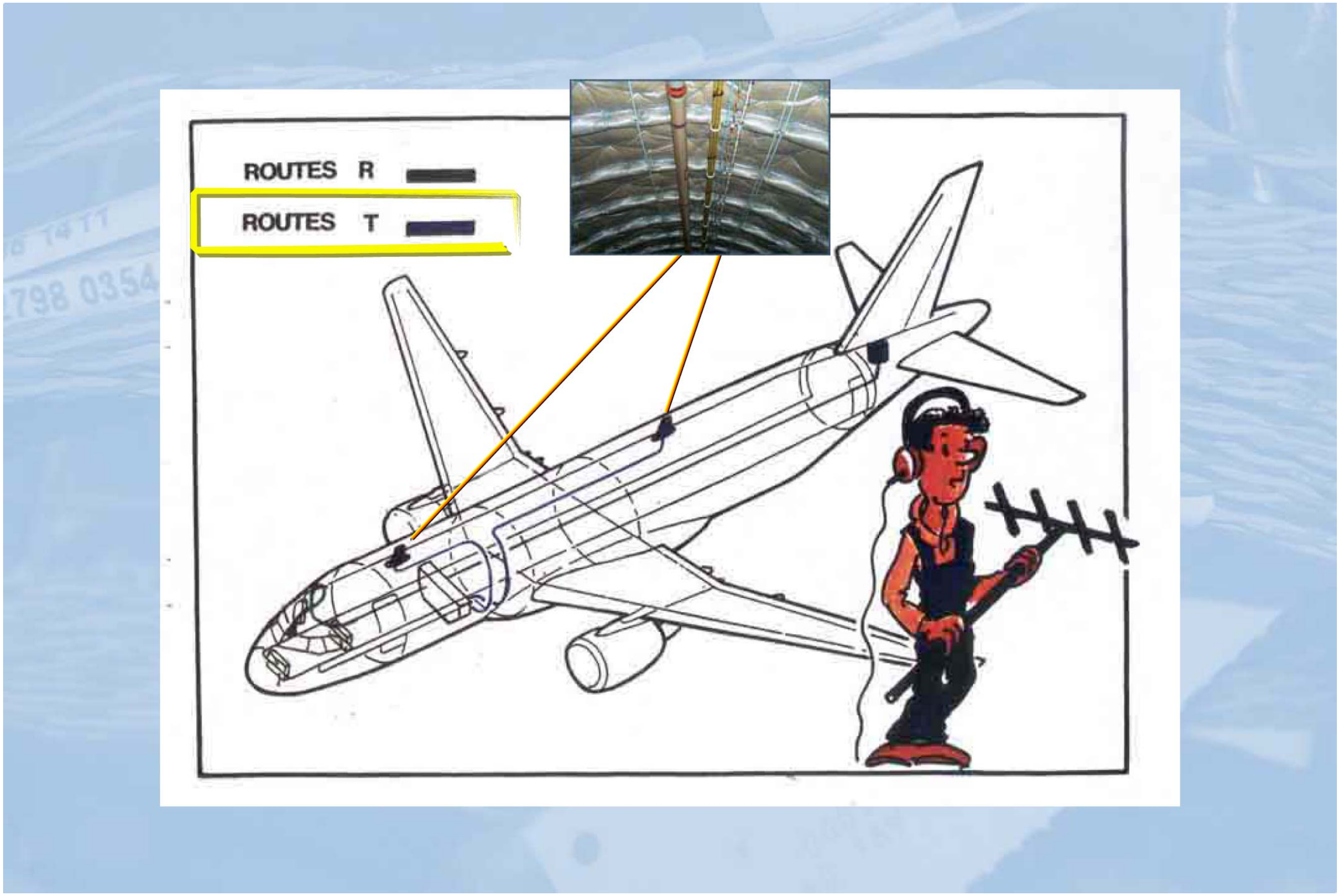
X8U08481 - X0332T0 - XM2026000000001



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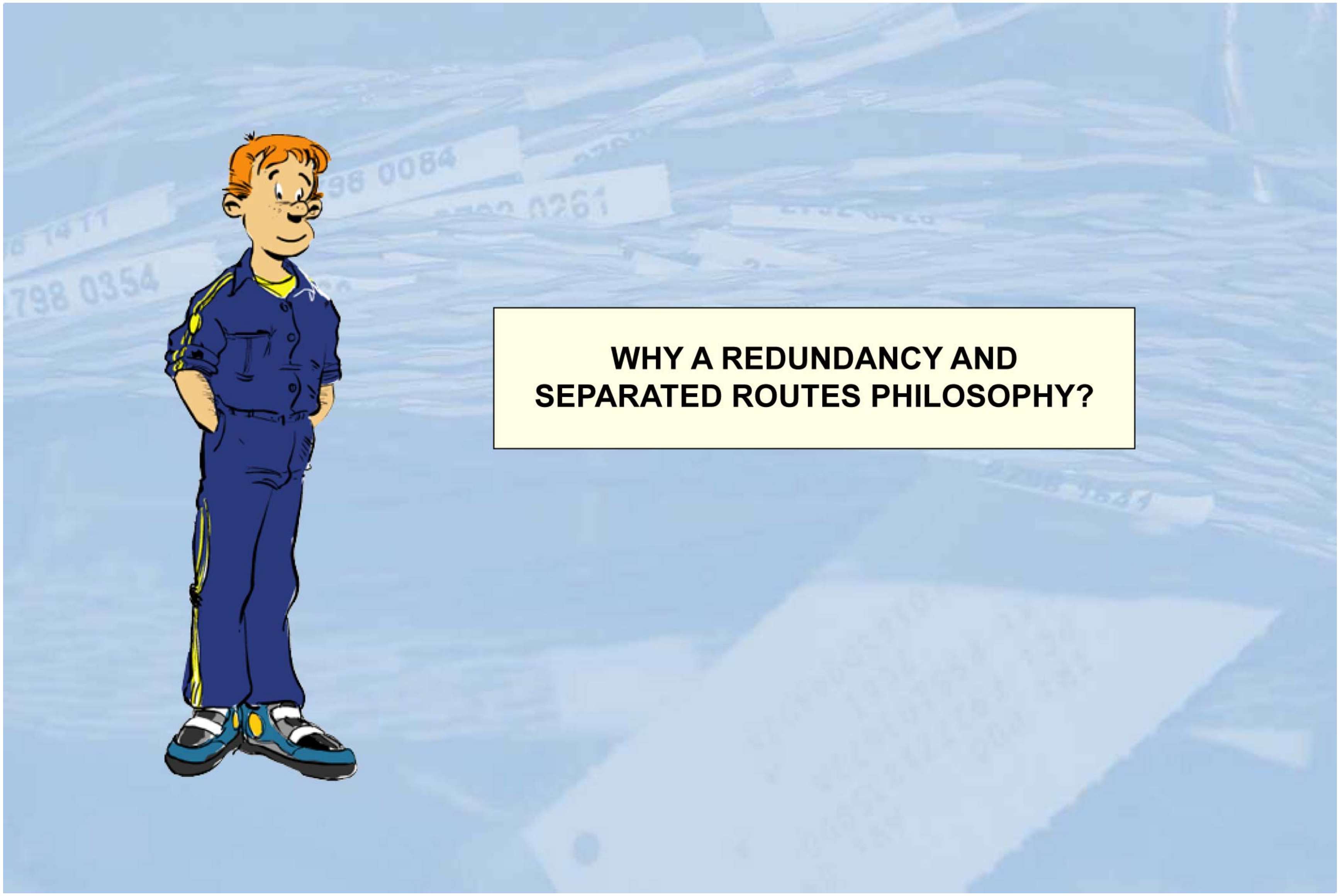

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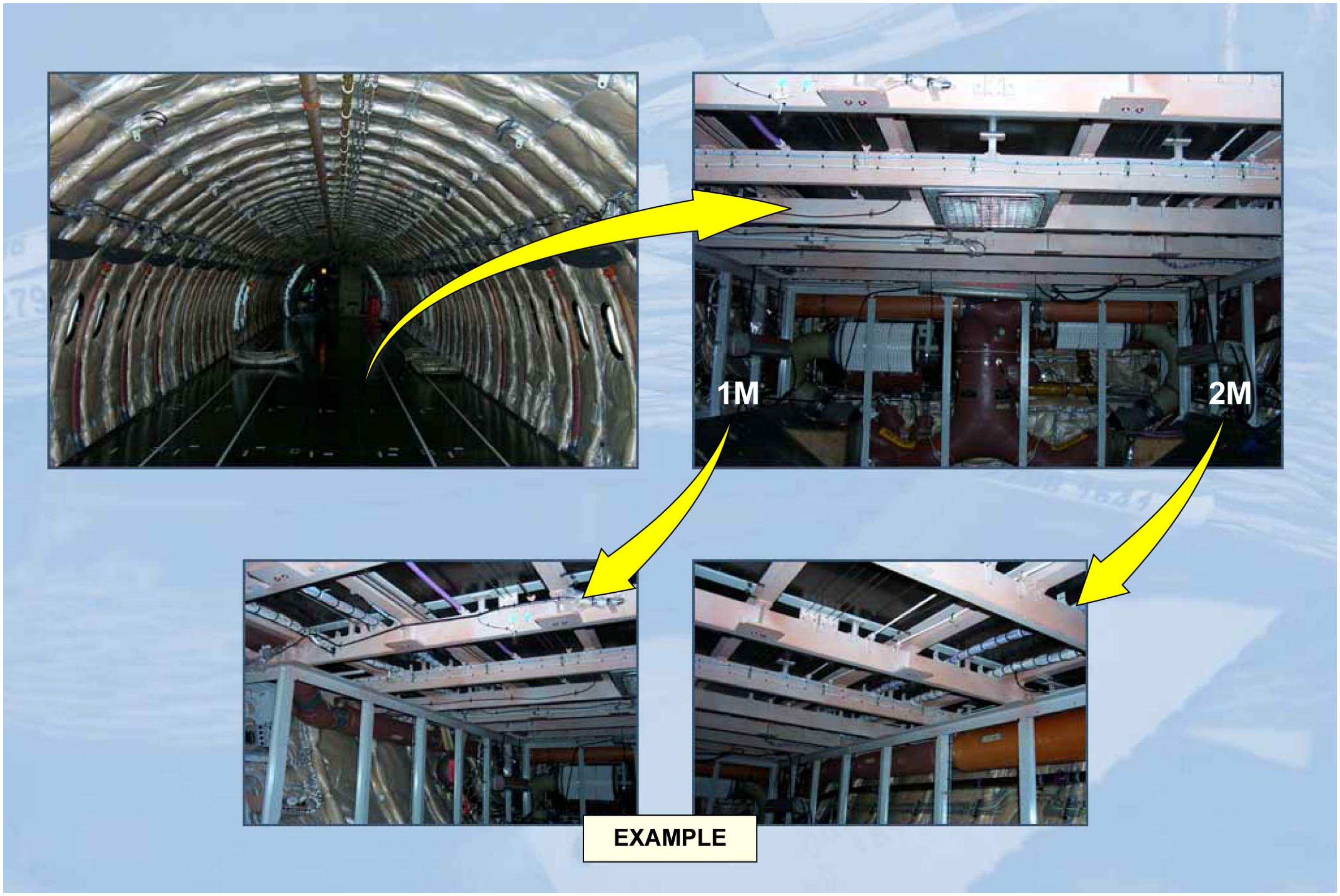

SEGREGATION

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WIRE BUNDLE INSTALLATION PRACTICES

ROUTING

Routing is the path a bundle has to follow at installation.
No structure or equipment contact is permitted
Utilization of spacers or separators avoids contacts
Special protective features

ROUTING

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

WIRING AND ROUTING - DESCRIPTION AND OPERATION

1. General

This topic gives the general design description and requirements related to installation of electrical wire bundles on aircraft.
Wiring installations meet the requirements of military specification MIL-W-25038 as regards to support, protection, accessibility, wire routing and other installation features.

2. Wiring

A. Lay-Out of Bundles

The wire bundle must not contain tangled wires or wires projecting outside the bundle.

B. Routing in Structure and Equipment

The wire bundles are routed in such a way that under no circumstances, even temporary, can they come into contact with the structure or adjacent equipment. Minimum distances separating wire bundles from structure/equipment are as follows:
- 25 mm (0.9842 in.) from structure/equipment located below wire bundles.
- 20 mm (0.7874 in.) from structure/equipment located alongside or above wire bundles.
  When these distances cannot be observed, a support must be provided in line with obstacle, so that the distances between it and the wiring are constant and at least equal to 10 mm (0.03937 in.).

C. Routing Along Pipings

Wire bundles run above or alongside pipings, at least 50 mm (1.9685 in.) distant from lines carrying flammable liquids such as fuel or hydraulic fluid, oxygen, etc.
The above minimum distance may be reduced to 15 mm (0.5905 in.) if the lines are not carrying flammable liquids, or very hot media such as air, water, etc...
For smaller distances, cables must run in conduits or be supported.
Electrical cables or conduits must not be attached to pipes, either directly or indirectly.

D. Maintenance

A certain amount of slack has been left in the wire bundles to make maintenance easier and enable:
- 2 replacements of end parts for cables gauges 12 to 24 (50 mm maximum),
- 1 replacement of end parts for cables gauges 10 to 0000 and coaxial cables (20 mm max).
  There must be no stress on connection bars, and when cables are connected to moving parts.

EFF : ALL

20-33-10

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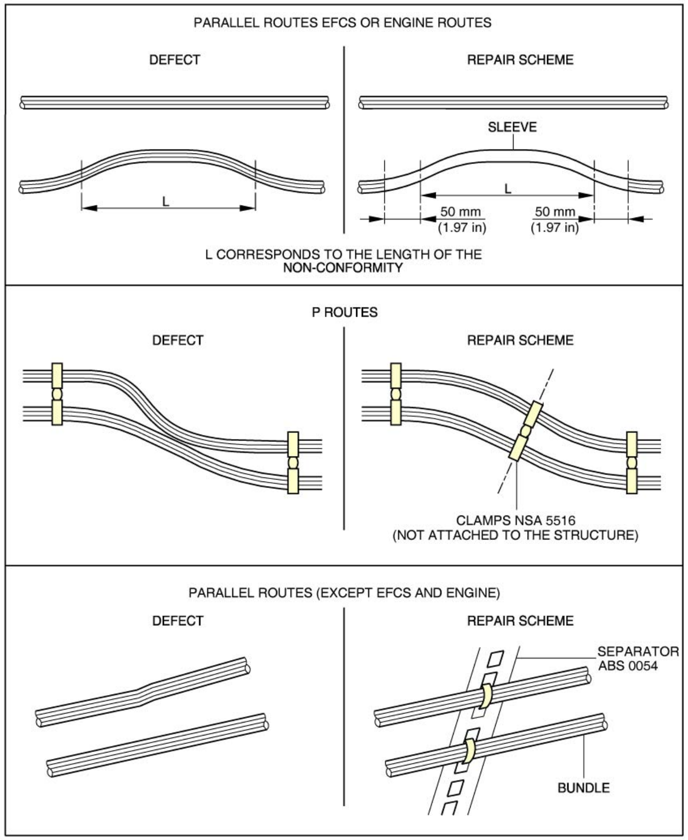
NO STRUCTURE OR EQUIPMENT CONTACT IS PERMITTED

ROUTING

X8U08481 - X0332T0 - XM2026000000001



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-52-12 - Loss of Segregation	

Figure 001 (Sheet 1) / 20-52-12 - Loss of Segregation

Print Date: Oct 09/08 Local Time | Page 1 of 1

ROUTING

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

E. Bend Radius

(1) Single cables gauge 24 to 10.

Gauge	Minimum bend radius in mm - Copper cables
24 and 22	6
20	7.5
18 to 12	10
10	15

(2) Coaxial cables and cables gauge 0000 to 8 (copper and aluminum cables).
The minimum radius shall be 10 times the external diameter of the cable.
In exceptional cases, a bend radius reduced to 6 times the diameter of the cable is permitted.

(3) BE or BF cables
The minimum radius shall be 3 times the cable diameter.

(4) 6 to 0000 gauge aluminum cables
The minimum radius must be equal to 10 times the outside diameter of the cable. In exceptional cases, it can be reduced to 6 times the outside diameter.

F. Special Protective Features

(1) Structure hole
When wire bundles run through structure holes, bundles must be positioned 5 mm (0.1968 in.) from the side of the structure hole by means of a clamp.
In exceptional cases, holes through which cables pass may be protected by flexiform grommets. This should be considered as only an additional precaution, the main protection is by sheathes.
...ct with these protections.
...rommets.

...ricted to preserve the open
...be used for routing in

...of material.

20-33-10 Page 2
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ELECTR...

Special precauti...
contamination of...
from water or hy...
In locations whe...
supports, flexib...
An 18 gauge elec...
conduits to be u...

G. Wire Addition
The standard process...
- removing progressi...
respect to the seg...
- adding the new wir...
- tying the new bund...
No tool are permit...
removing the bindi...

H. Wire Replacement
If it is impossible to remove one or more damaged conductors from a bundle, two procedures are adopted:
- Replacement by other conductors installed outside the bundle. (It is necessary to remove the attachment clamps, tyraps and supports to install the new conductor in the bundle).
To remove a defect that you find on an EFCS harness, add EFCS cables outside the harness.
- In-line jointing by splicing; this method is used only under wholly exceptional circumstances.
The conductors left in place will have their ends insulated.
For more informations about wire repairs ref.20-53-2x.

J. Attachment Clamps and Supports
Attachment of wire bundles is carried out by means of cable suport, clamps raceways ,tie-wraps or in certain special cases, by binding to ramp supports. (Ref. Chapter 20-33-4x).

(1) Cable supports
Nylon cradles used are Type NSA935501 or E0435 where temperature is not above 135°C.

(2) Clamps

(a) Type of clamps
- As a general rule (maximum cable temperature 130°C (266°F), the clamps are made of Type NSA5515 nylon.
- For temperature exceeding 130°C (266°F) (or for strands exceeding 32 mm (1.2598 in.) clamps are made of Type NSA5516.

EFF : ALL

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Apr 01/01

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ROUTING

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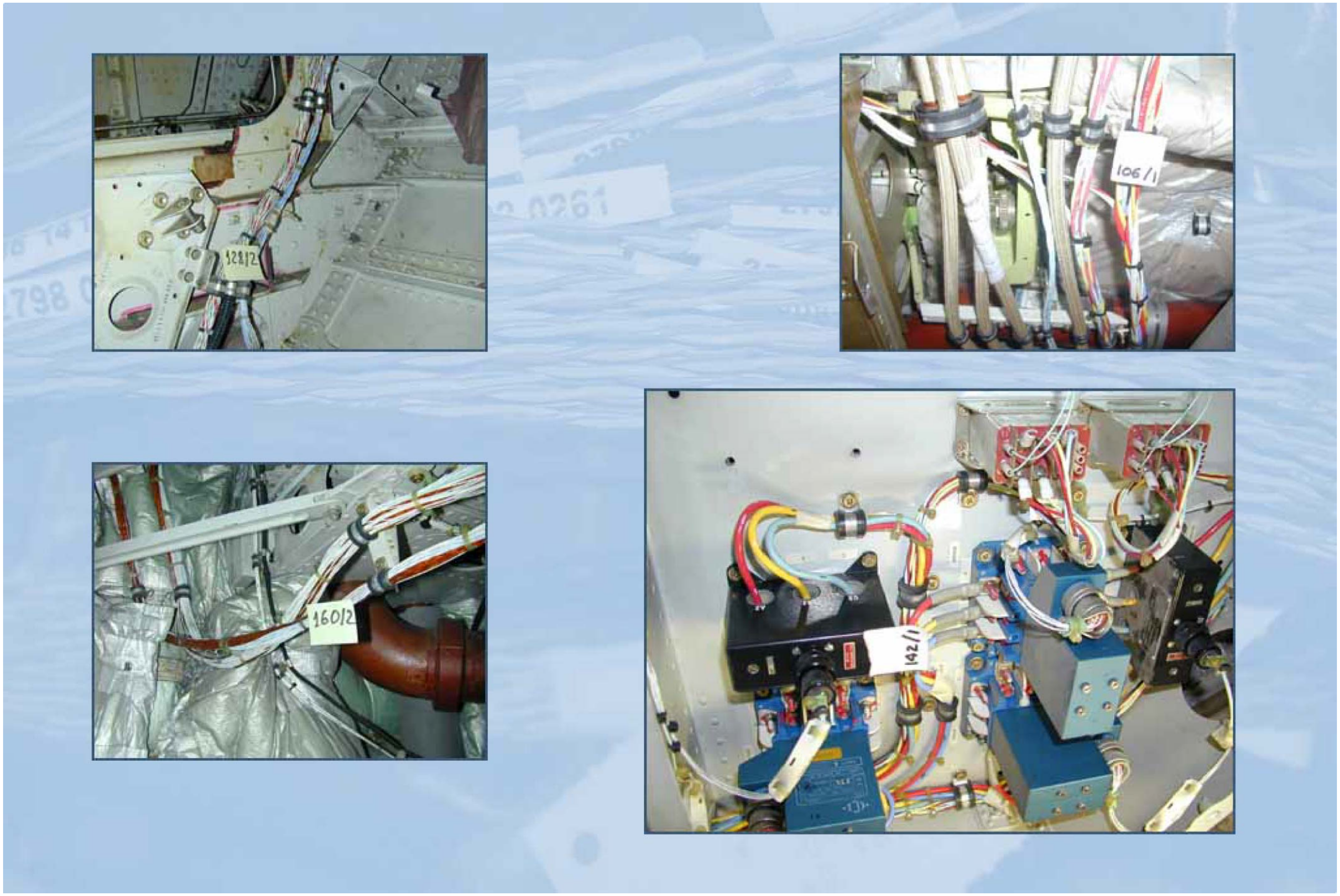
WIRE BUNDLE INSTALLATION PRACTICES

CLAMP INSPECTION

Clamp inspection practices
Check general condition of the clamp:
1- Existing clamp
2- Protection of the clamp
3- Check there is no rupture of the clamp
4- Check if there is no corrosion nor deformation
Make sure there is no movement of the bundle or convoluted conduit by applying a light force to the bundle.



CLAMP INSPECTION

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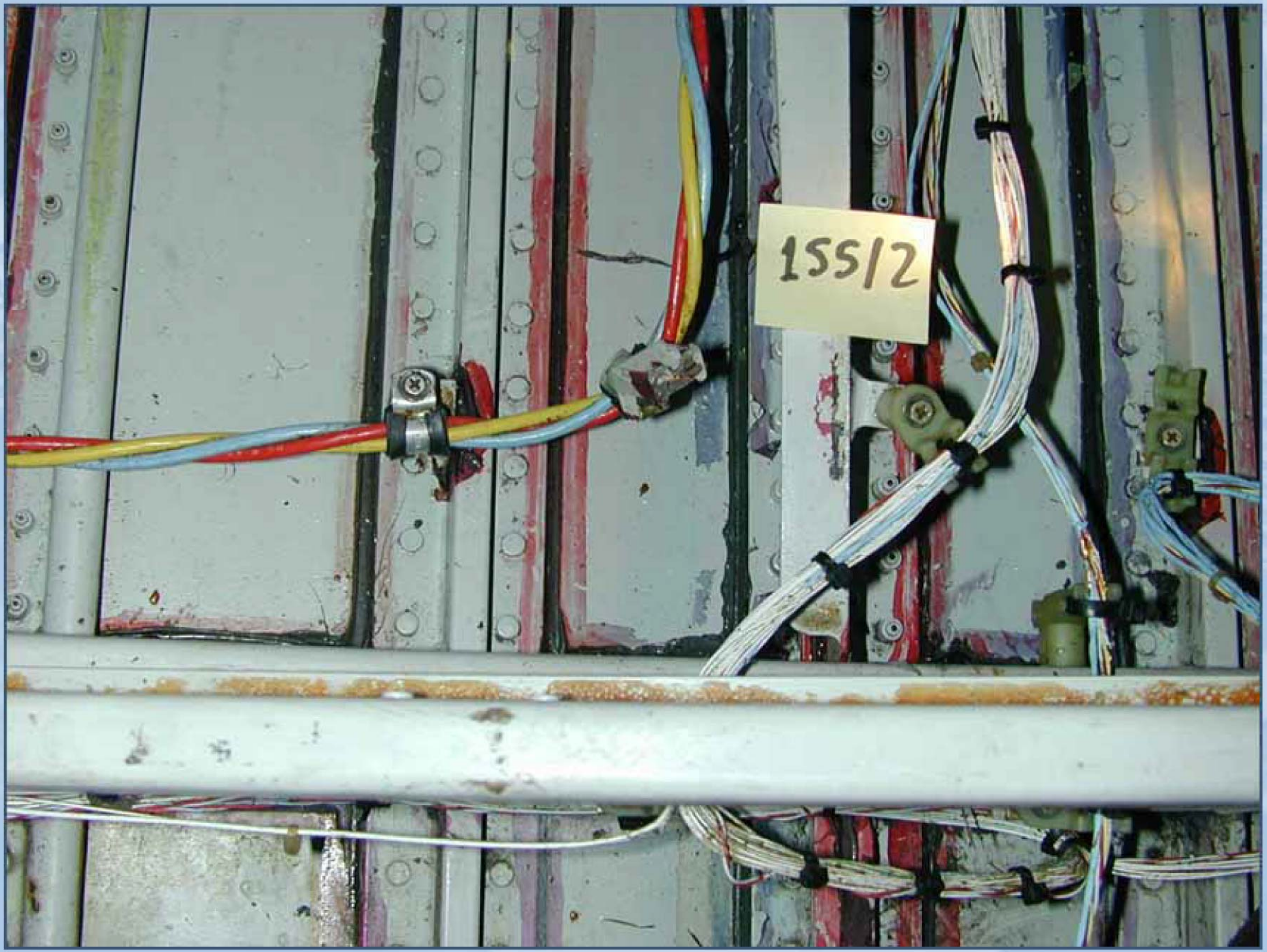
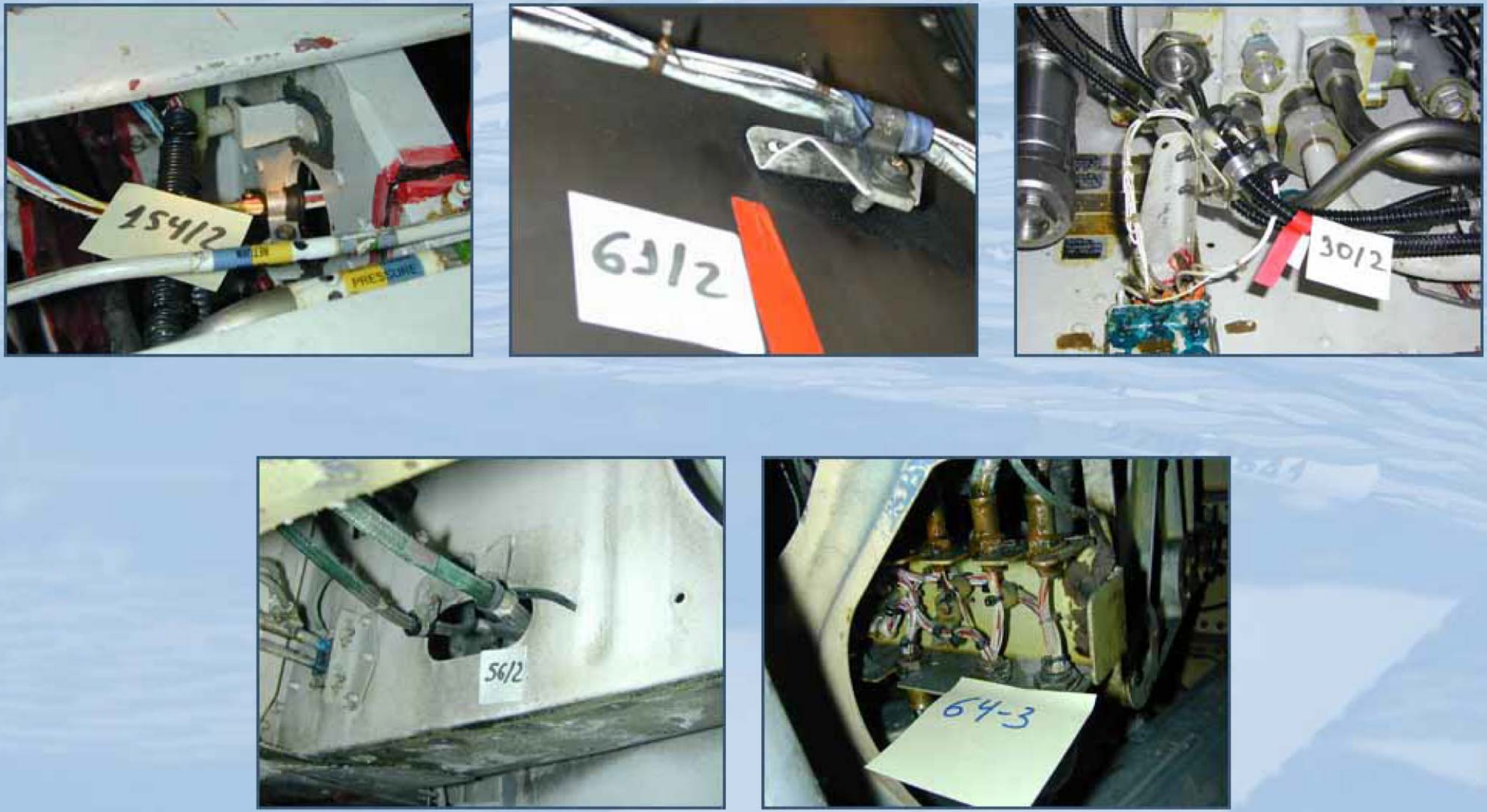


CLAMP INSPECTION



CLAMP INSPECTION

X8U08481 - X0332T0 - XM202600000001

CLAMP INSPECTION

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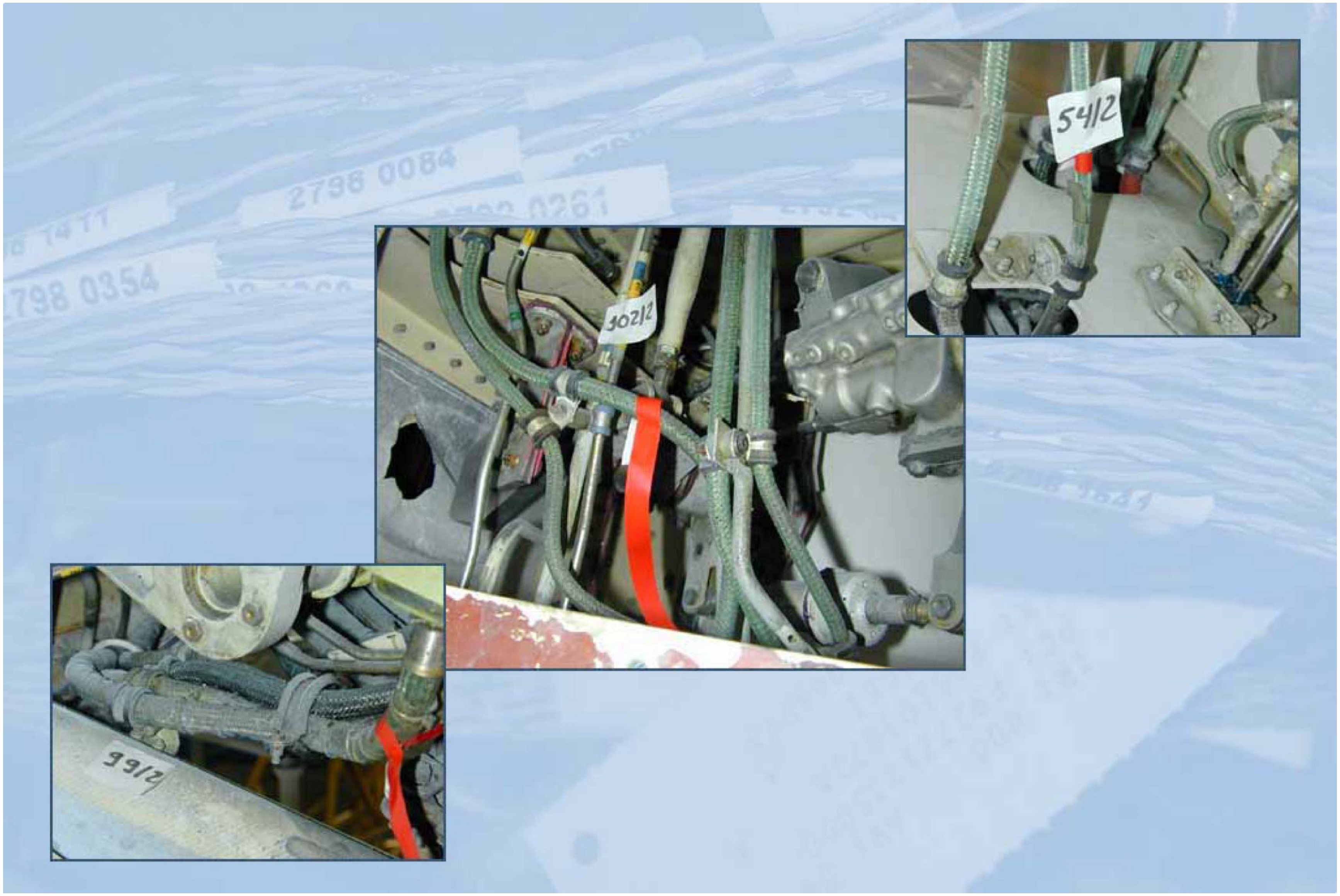

CLAMP INSPECTION

CLAMP INSPECTION

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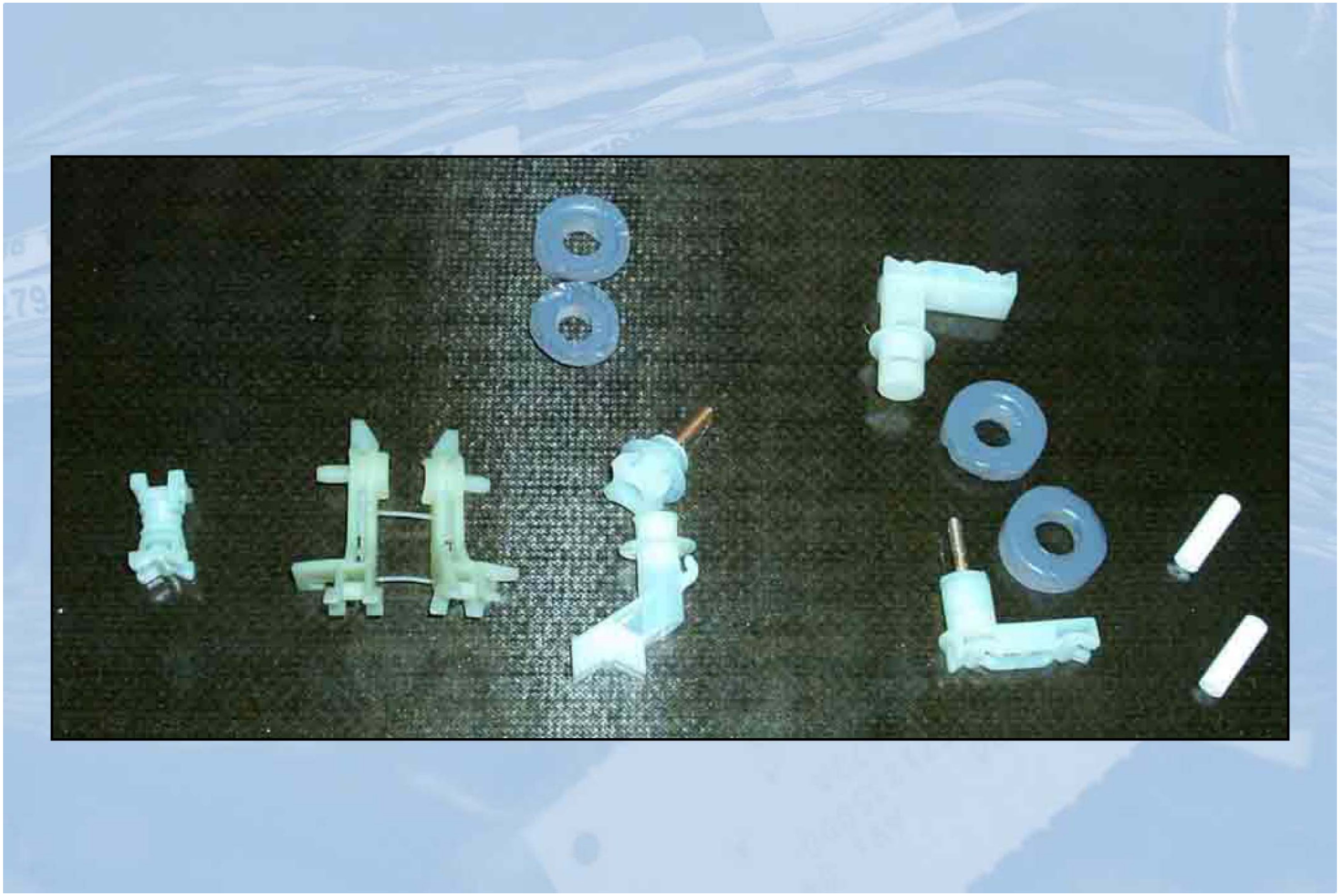
WIRE BUNDLE INSTALLATION PRACTICES

CLAMP AND SUPPORT: REMOVAL AND FITTING

Clamp removal and fitting
Supports
Wedge support type.
NSA 935 513
NSA 935 514
Used in pressurized areas for bundles of max diameter 25mm (0.9842 in)
Installation process:
- Engage the wedge part with notch in the hole
- Partially engage the other part
- Fully engage the two parts with the tool

Note: To facilitate the installation and to prevent corrosion, you can use paste mat 05-7070
Bundle installation
Support NSA 935 514.
Secure the screwed assembly with adhesive product (MAT-08-048)
Other support type: V shaped.
U or V shaped supports.
V shaped supports.
V shaped supports.
U- supports.
U- supports.
Fairlead guide type.
Fairlead guide type.
Separators and spacers
Separators and spacers
Special cases of attachments.
Clamps
3 main clamps types.
Nylon clamp NSA 5515
Protected clamp NSA 5516 or MS 21919.
P clamp Type NSA 935807
Clamp installation example.
Installation on structure.
Installation on structure.

CLAMP AND SUPPORT: REMOVAL AND FITTING



CLAMP AND SUPPORT: REMOVAL AND FITTING

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CLAMP AND SUPPORT: REMOVAL AND FITTING

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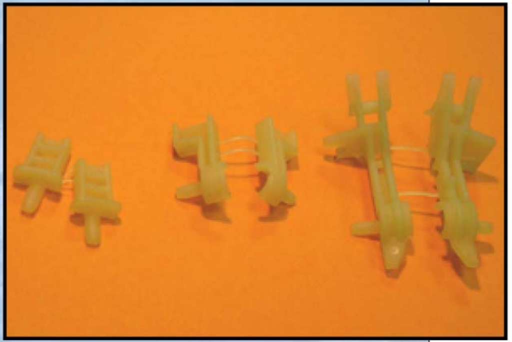

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-33-41 - Cable Supports - Description and Installation - NSA935513	

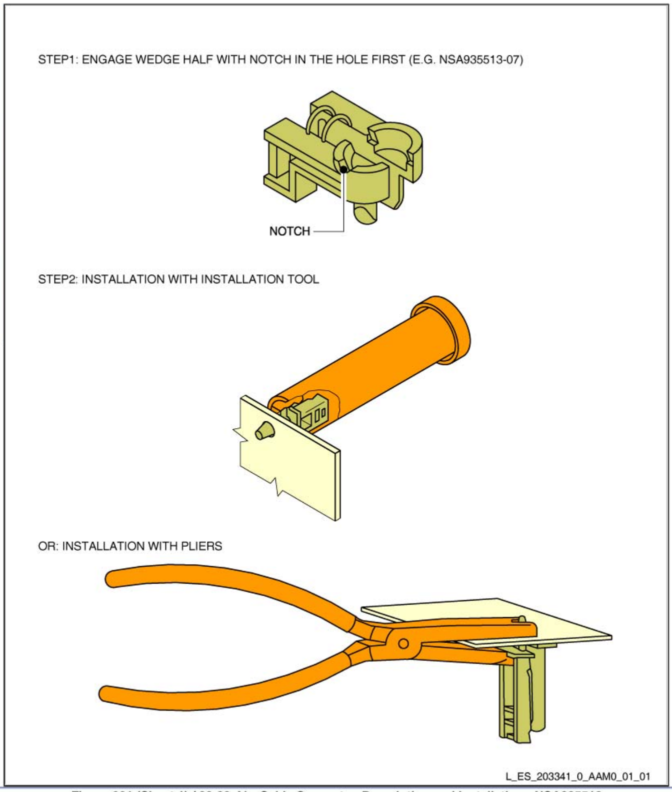

Figure 001 (Sheet 1) / 20-33-41 - Cable Supports - Description and Installation - NSA935513

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CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM2026000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-33-41 - Cable Supports - Cable Installation - NSA935513

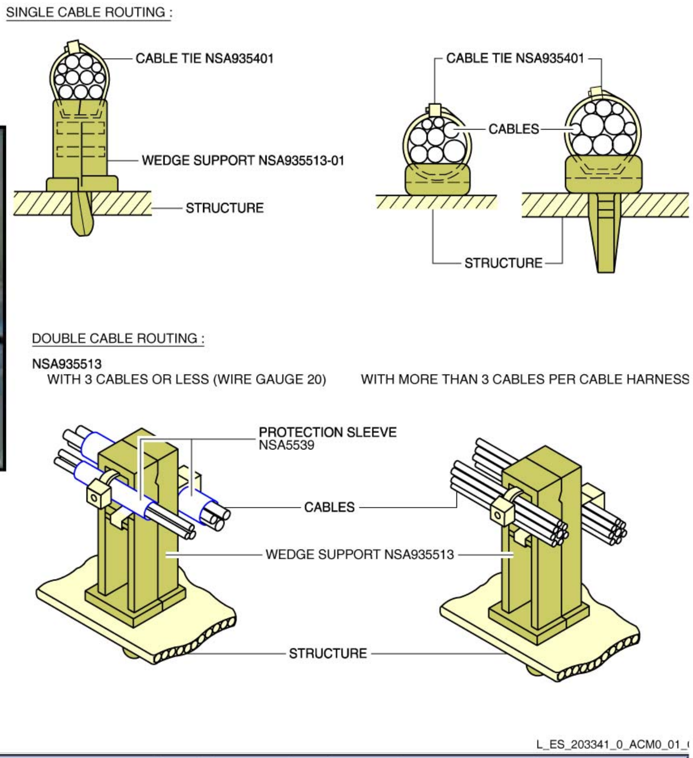

Figure 002 (Sheet 1) / 20-33-41 - Cable Supports - Cable Installation - NSA935513

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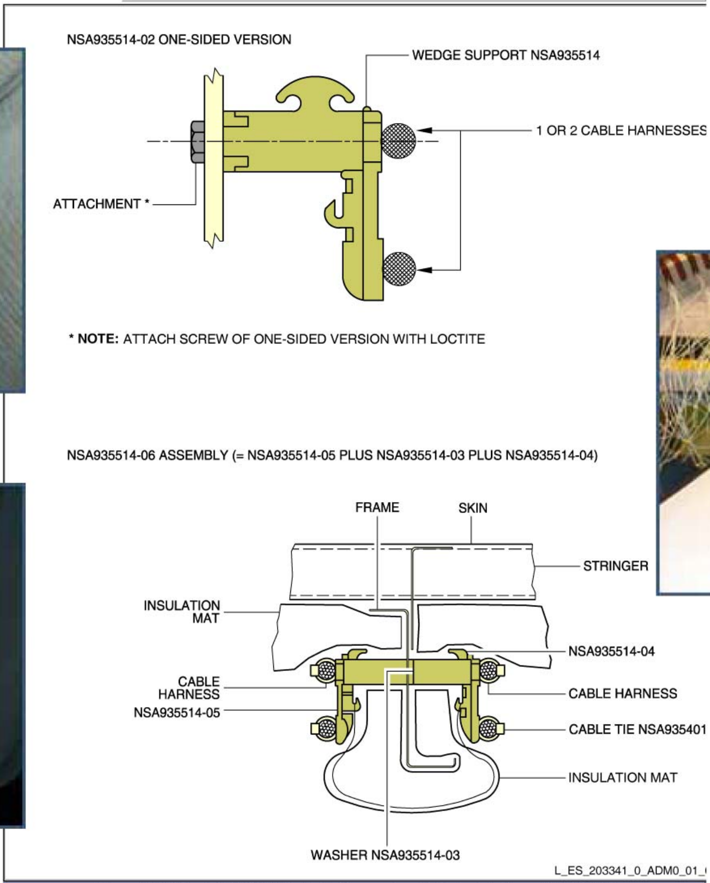
CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM2026000000001



Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-33-41 - Cable Supports - Cable Installation - NSA935514

Figure 003 (Sheet 1) / 20-33-41 - Cable Supports - Cable Installation - NSA935514

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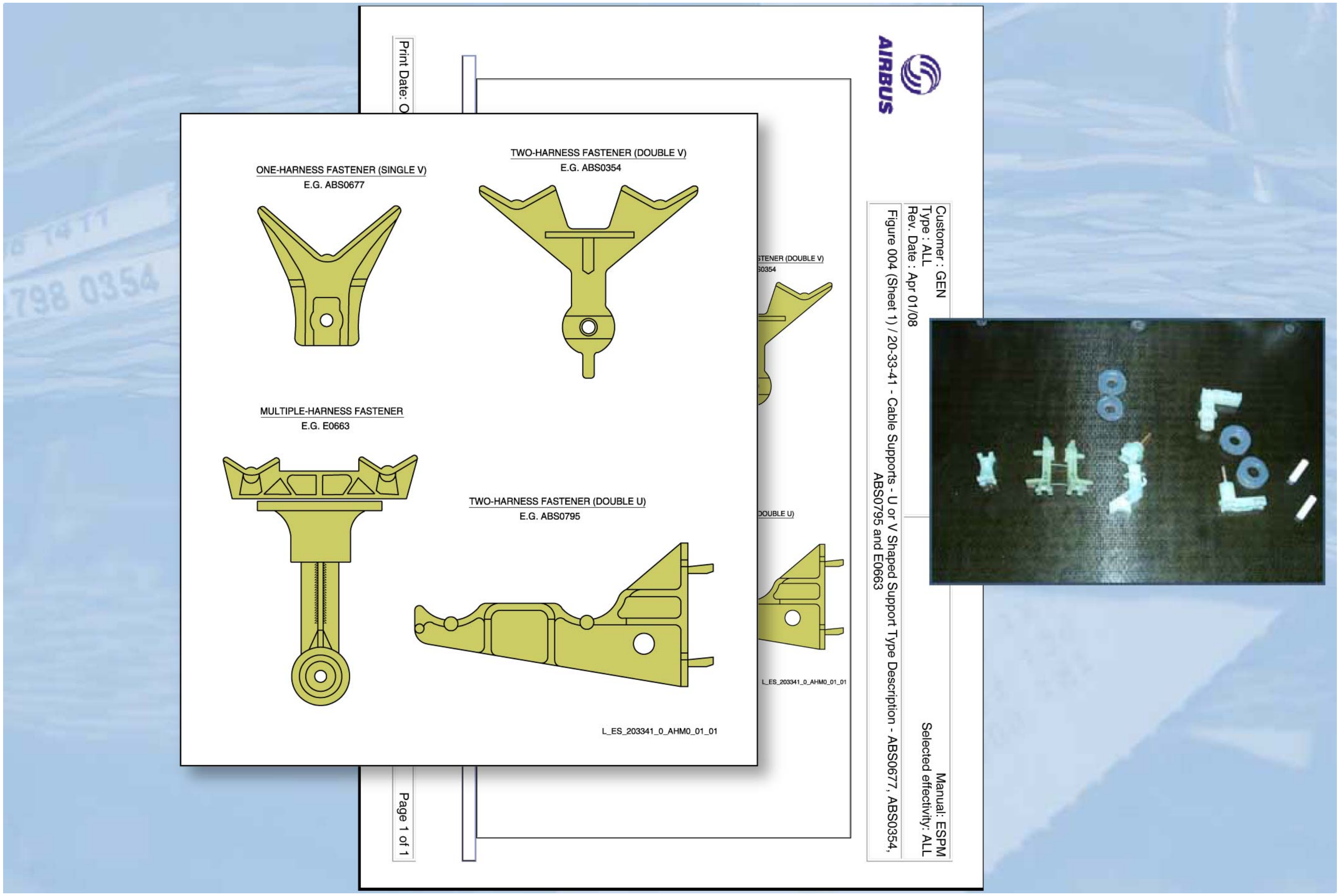
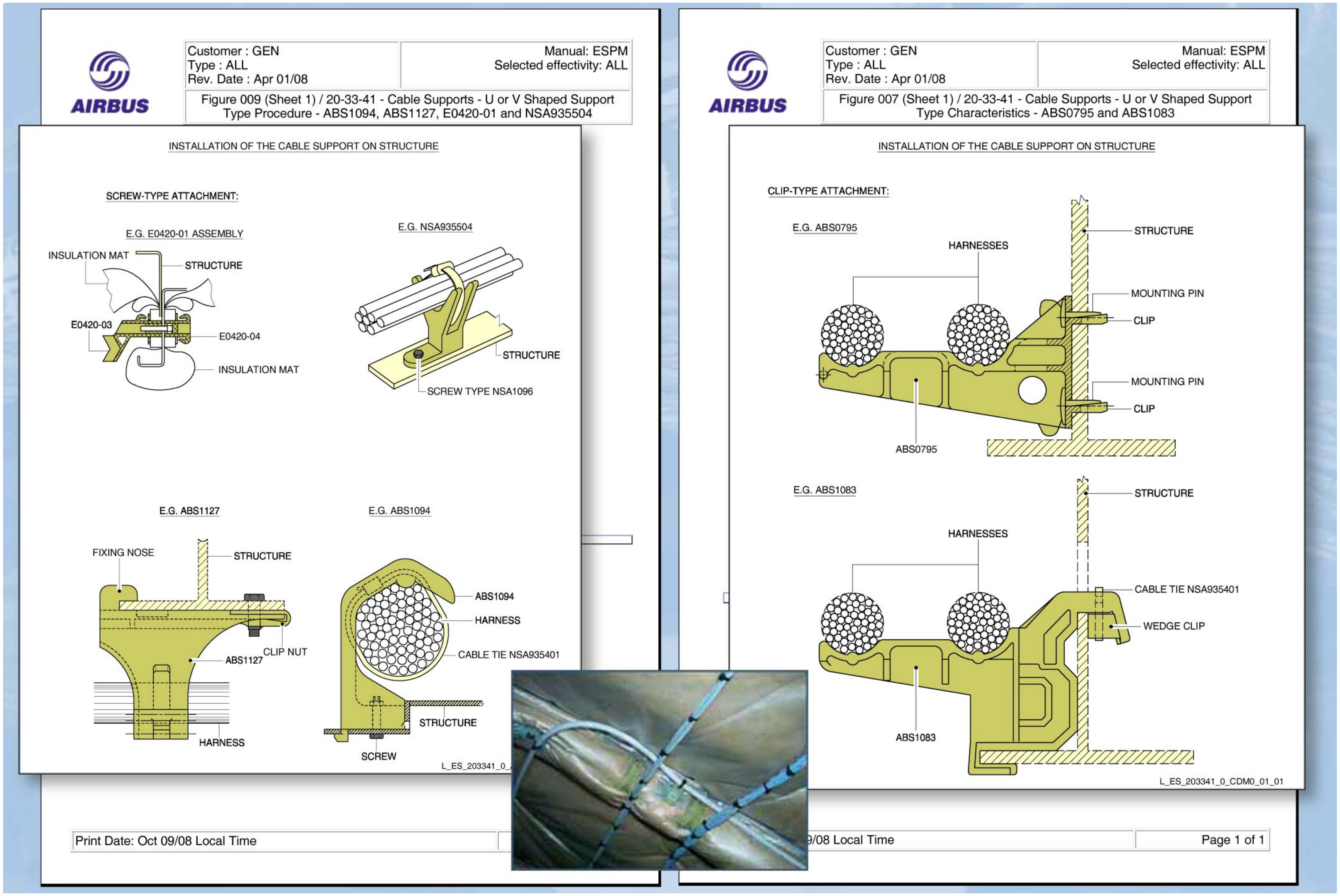
CLAMP AND SUPPORT: REMOVAL AND FITTING

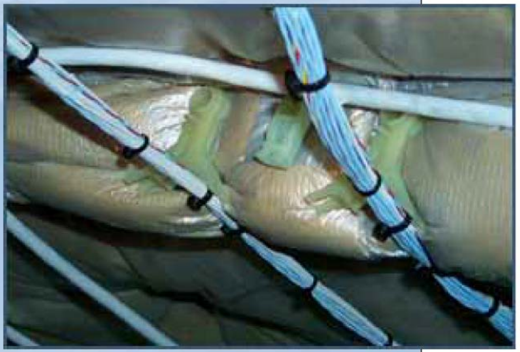
X8U08481 - X0332T0 - XM2026000000001



CLAMP AND SUPPORT: REMOVAL AND FITTING



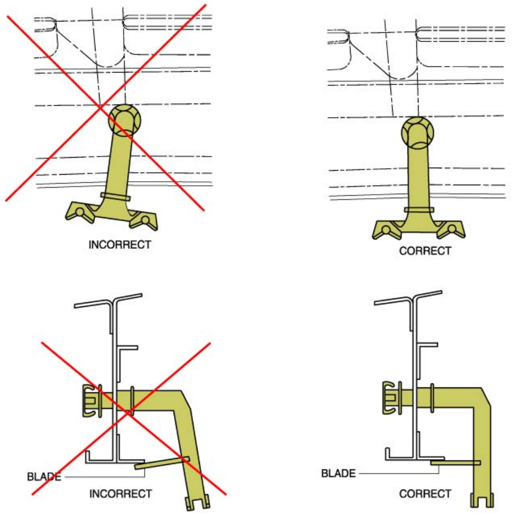
CLAMP AND SUPPORT: REMOVAL AND FITTING



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 010 (Sheet 1) / 20-33-41 - Cable Supports - U or V Shaped Support Type Installation - E0663	

INSTALLATION OF THE CABLE SUPPORT ON STRUCTURE

DO NOT MOVE THE SUPPORT BEFORE IT IS INSTALLED ON THE AIRCRAFT, BECAUSE THIS CAN CAUSE DAMAGE TO THE RACK .YOU MUST INSTALL IT PERPENDICULAR TO THE CHORD OR THE HEEL OF THE FRAME OR CROSS-BEAM.



PUSH THE ANTI-ROTATION BLADE OF THE SUPPORT BACK AGAINST THE STRUCTURE BEFORE YOU TIGHTEN THE SUPPORT FASTENER SCREW TO TORQUE.

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Figure 010 (Sheet 1) / 20-33-41 - Cable Supports - U or V Shaped Support Type Installation - E0663

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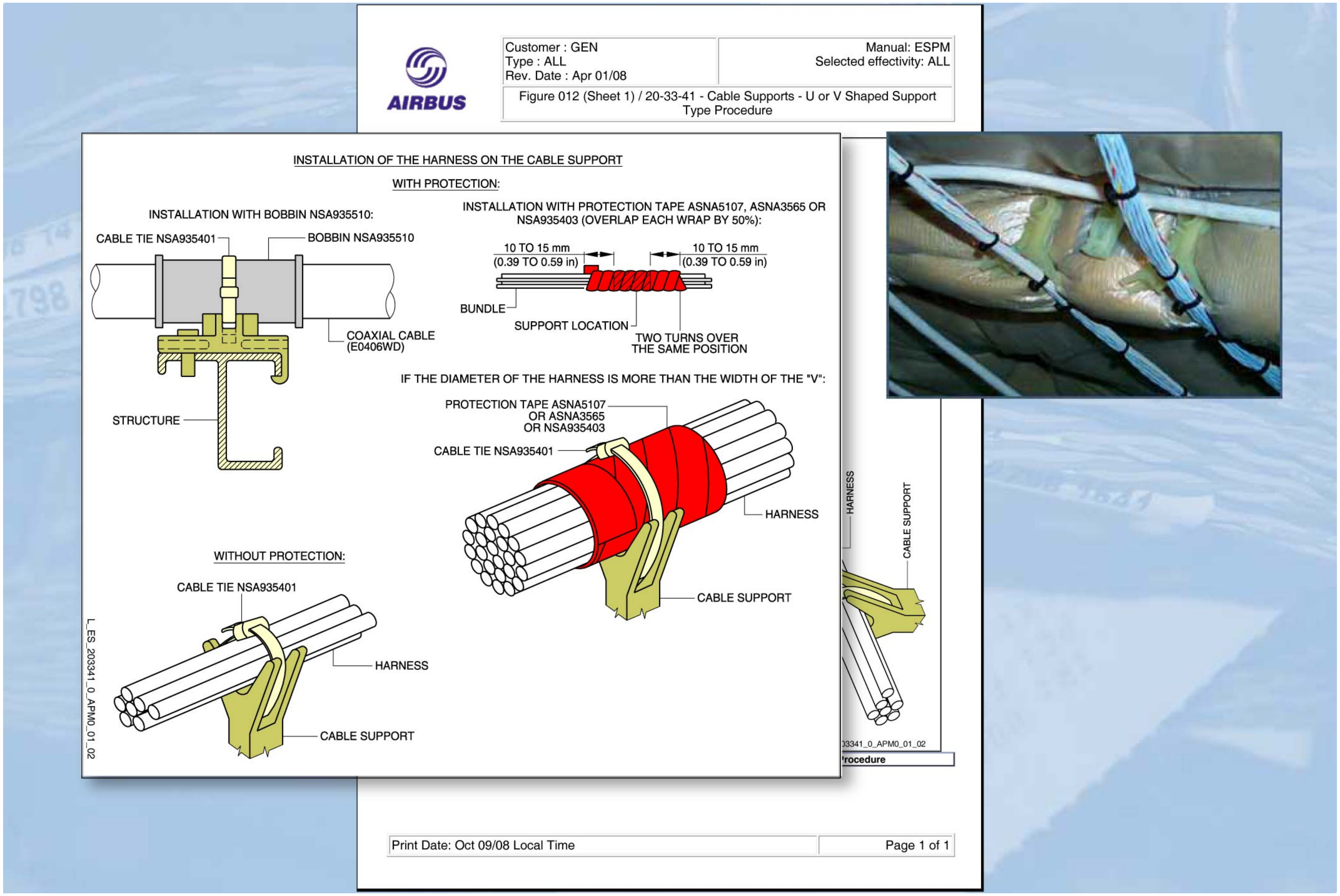
CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM202600000001



CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM20260000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 013 (Sheet 1) / 20-33-41 - Cable Supports - U-clamp Type Description - E0435 and NSA935501	

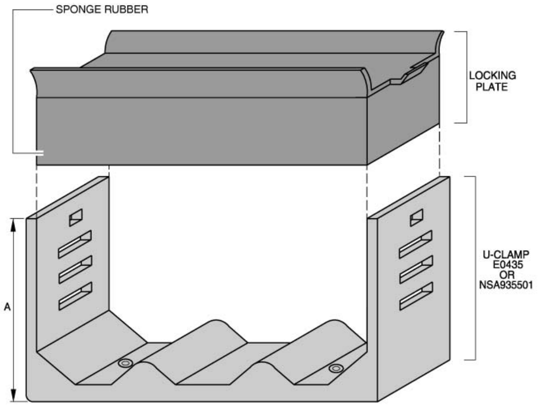


Figure 013 (Sheet 1) / 20-33-41 - Cable Supports - U-clamp Type Description - E0435 and NSA935501

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CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM2026000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 014 (Sheet 1) / 20-33-41 - Cable Supports - U-clamp Type Procedure - NSA935501

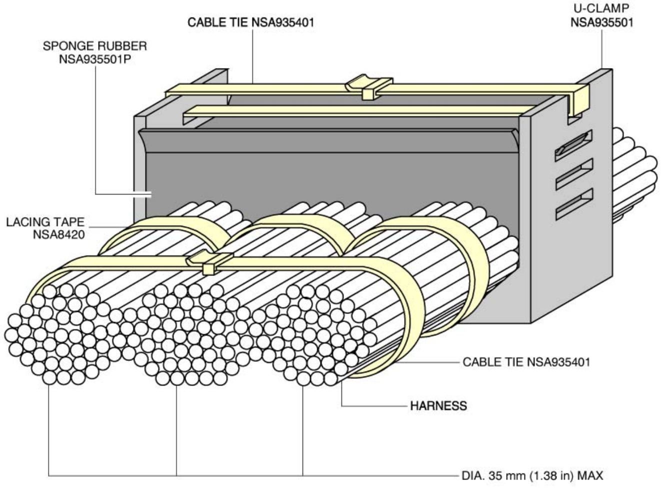

Figure 014 (Sheet 1) / 20-33-41 - Cable Supports - U-clamp Type Procedure - NSA935501

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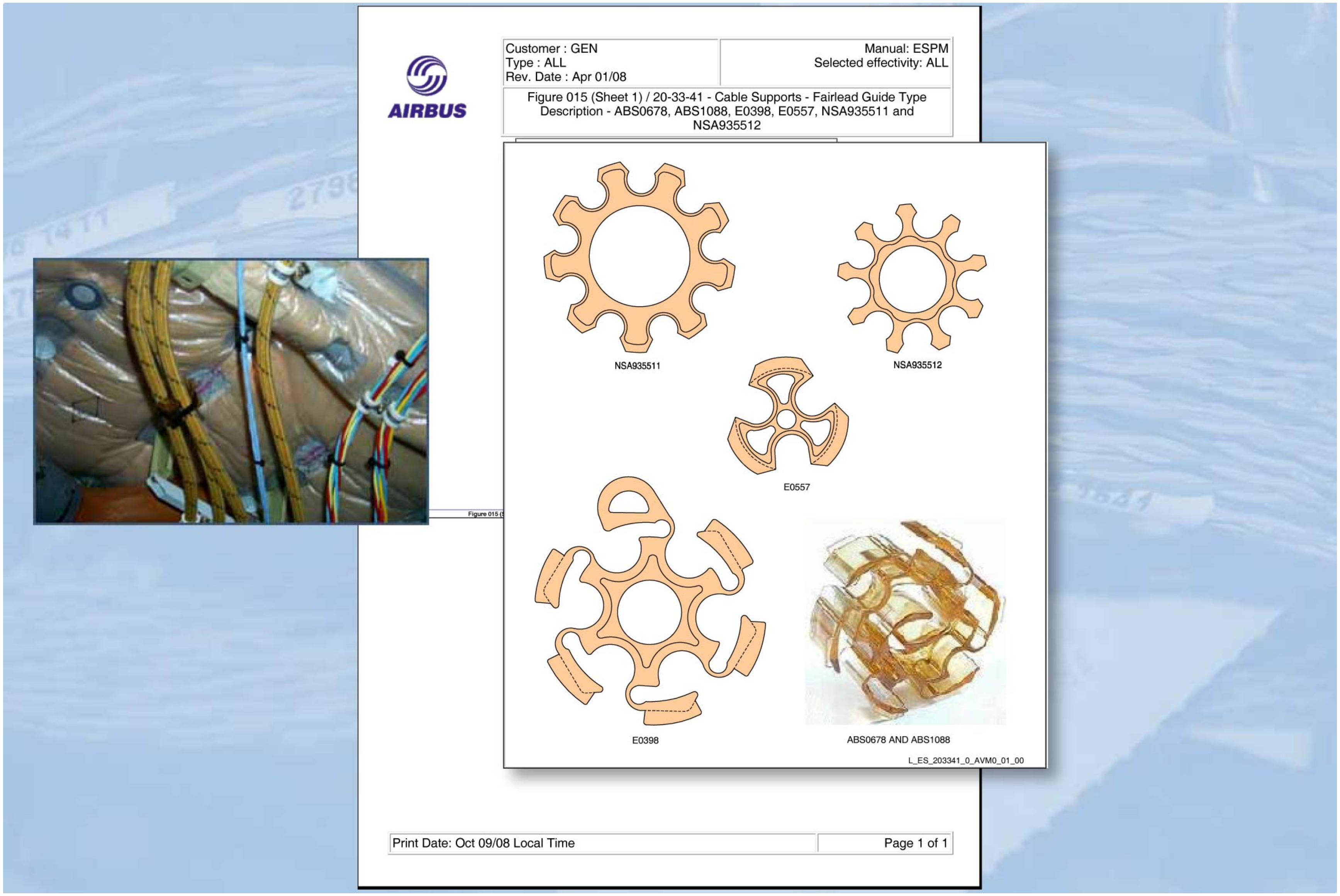
CLAMP AND SUPPORT: REMOVAL AND FITTING

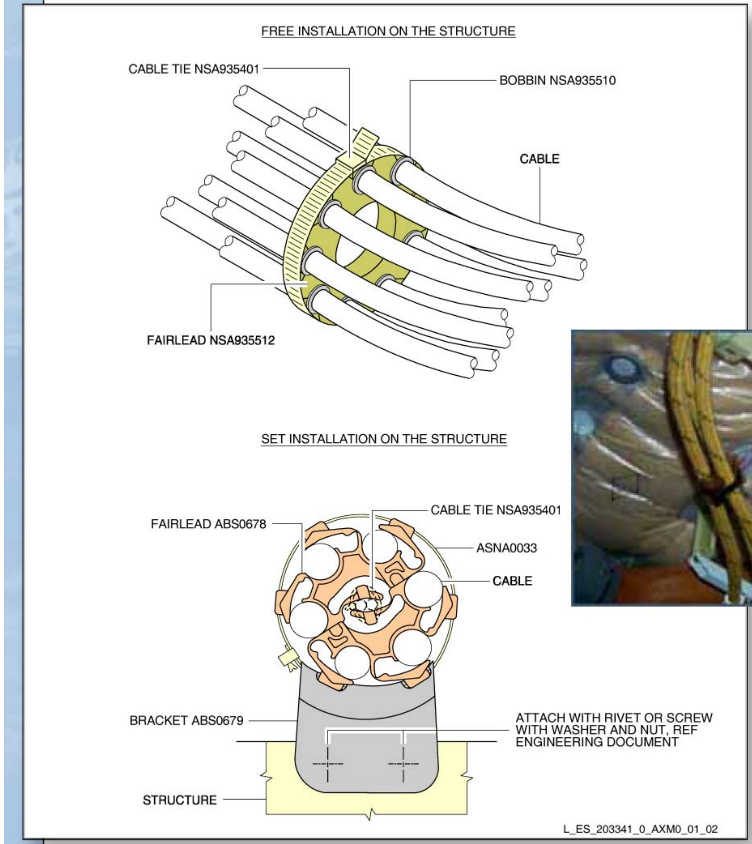


CLAMP AND SUPPORT: REMOVAL AND FITTING

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 016 (Sheet 1) / 20-33-41 - Cable Supports - Fairlead Guide Type Installation - ABS0678 with ABS0679 and NSA935512



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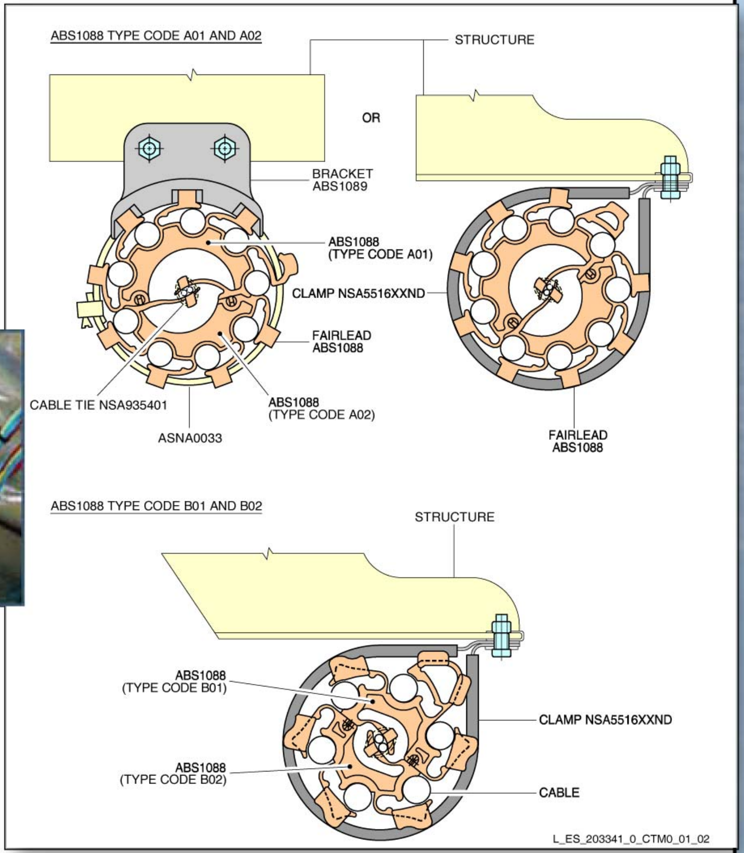
Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 017 (Sheet 1) / 20-33-41 - Cable Supports - Fairlead Guide Type Installation - ABS1088 with ABS1089 and NSA5516



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CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM20260000000001

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 018 (Sheet 1) / 20-33-41 - Cable Supports - Separator and Spacer Type Description - ABS0731, ABS1144, E0688 and NSA5527

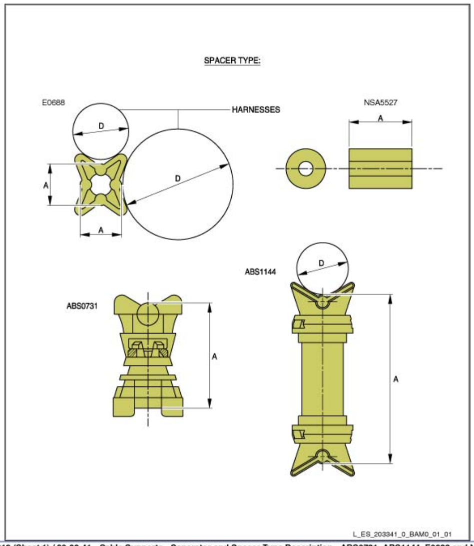

Figure 018 (Sheet 1) / 20-33-41 - Cable Supports - Separator and Spacer Type Description - ABS0731, ABS1144, E0688 and NSA5527

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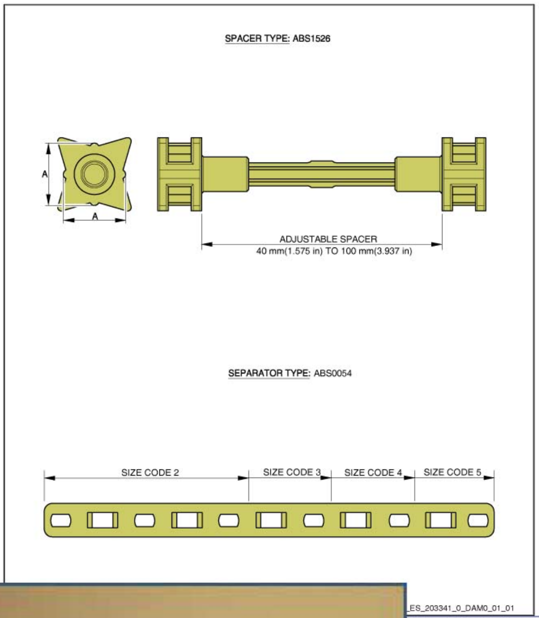
AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 019 (Sheet 1) / 20-33-41 - Cable Supports - Separator and Spacer Type Description - ABS0054 and ABS1526



on - ABS0054 and ABS1526

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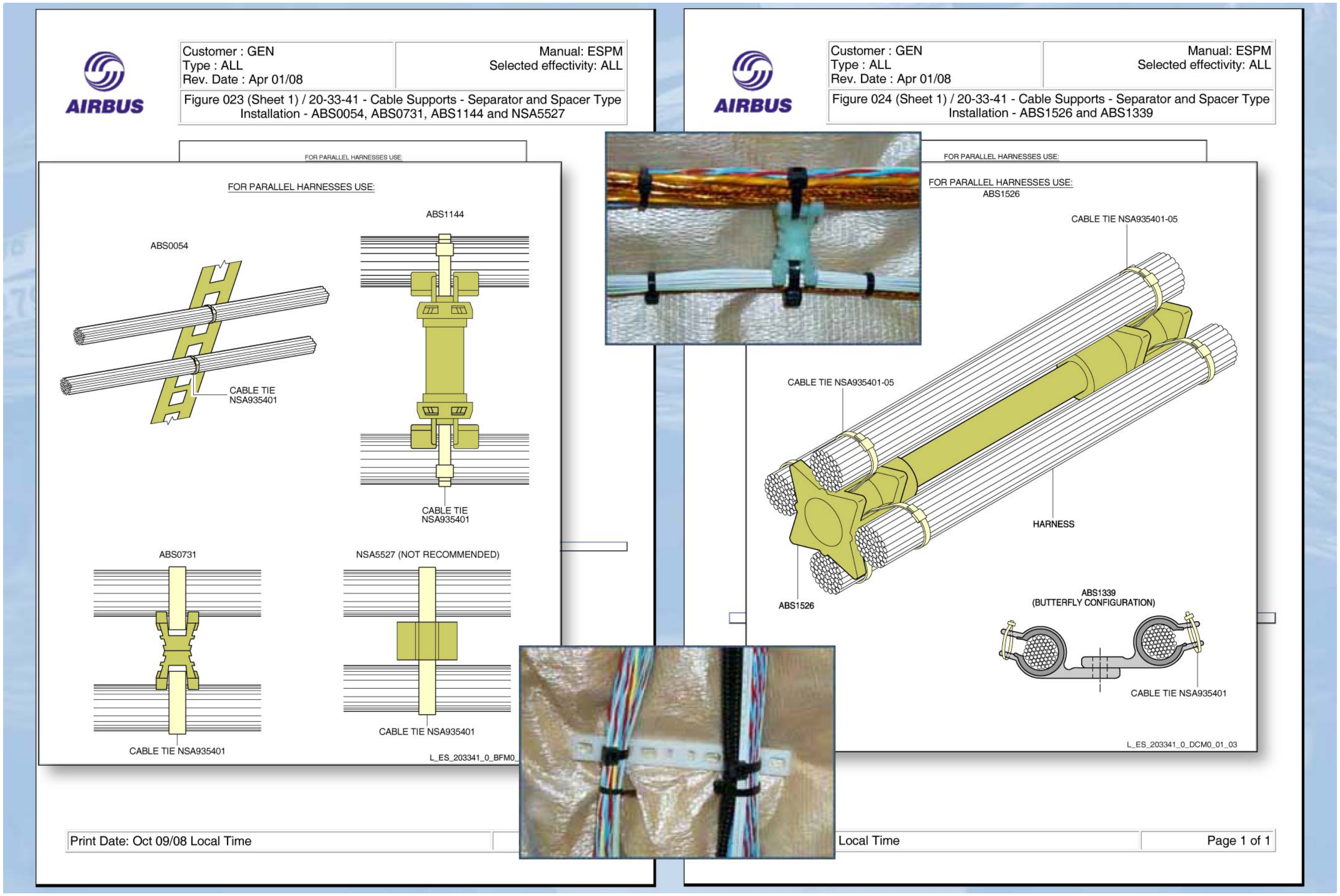
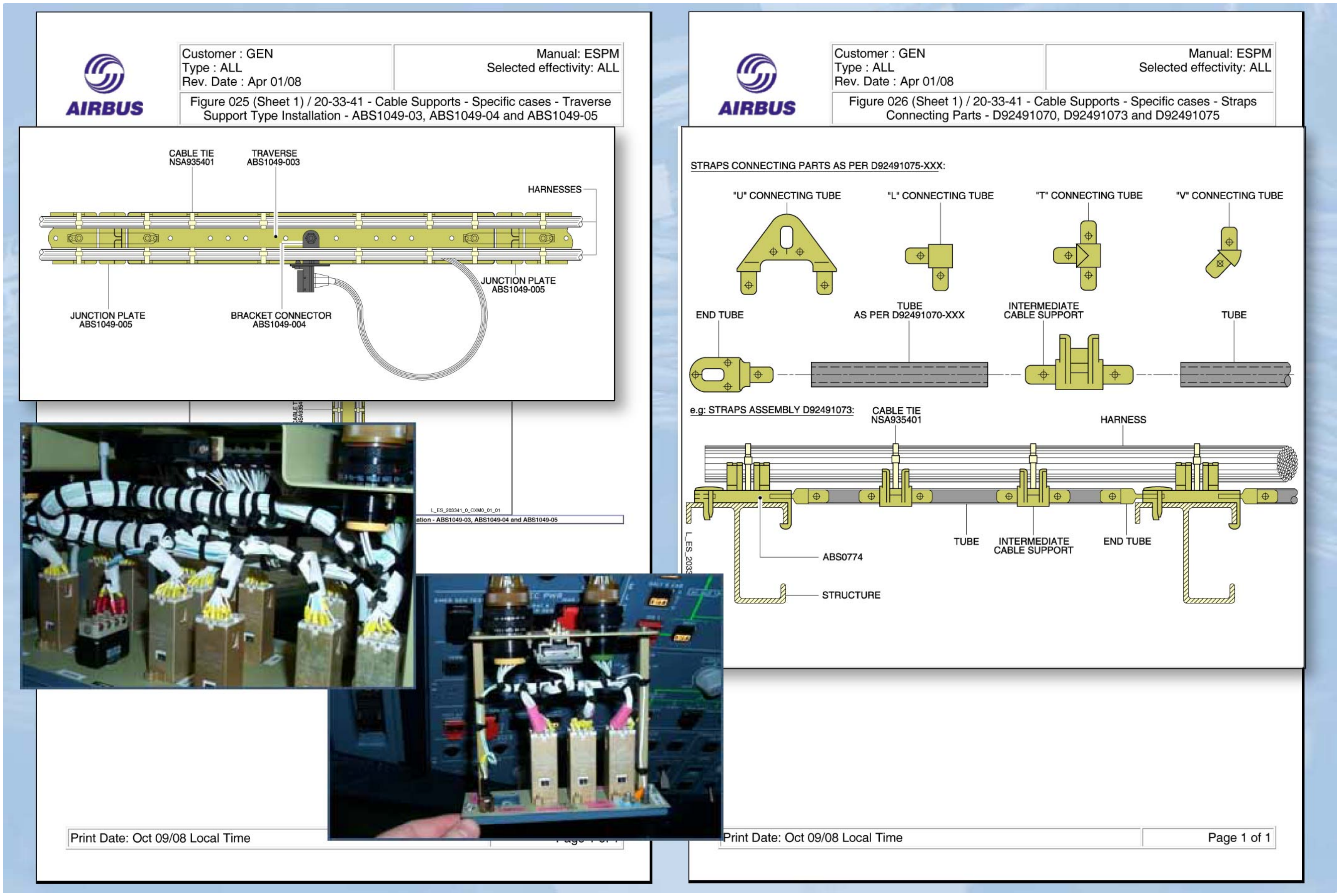
X8U08481 - X0332T0 - XM2026000000001

CLAMP AND SUPPORT: REMOVAL AND FITTING



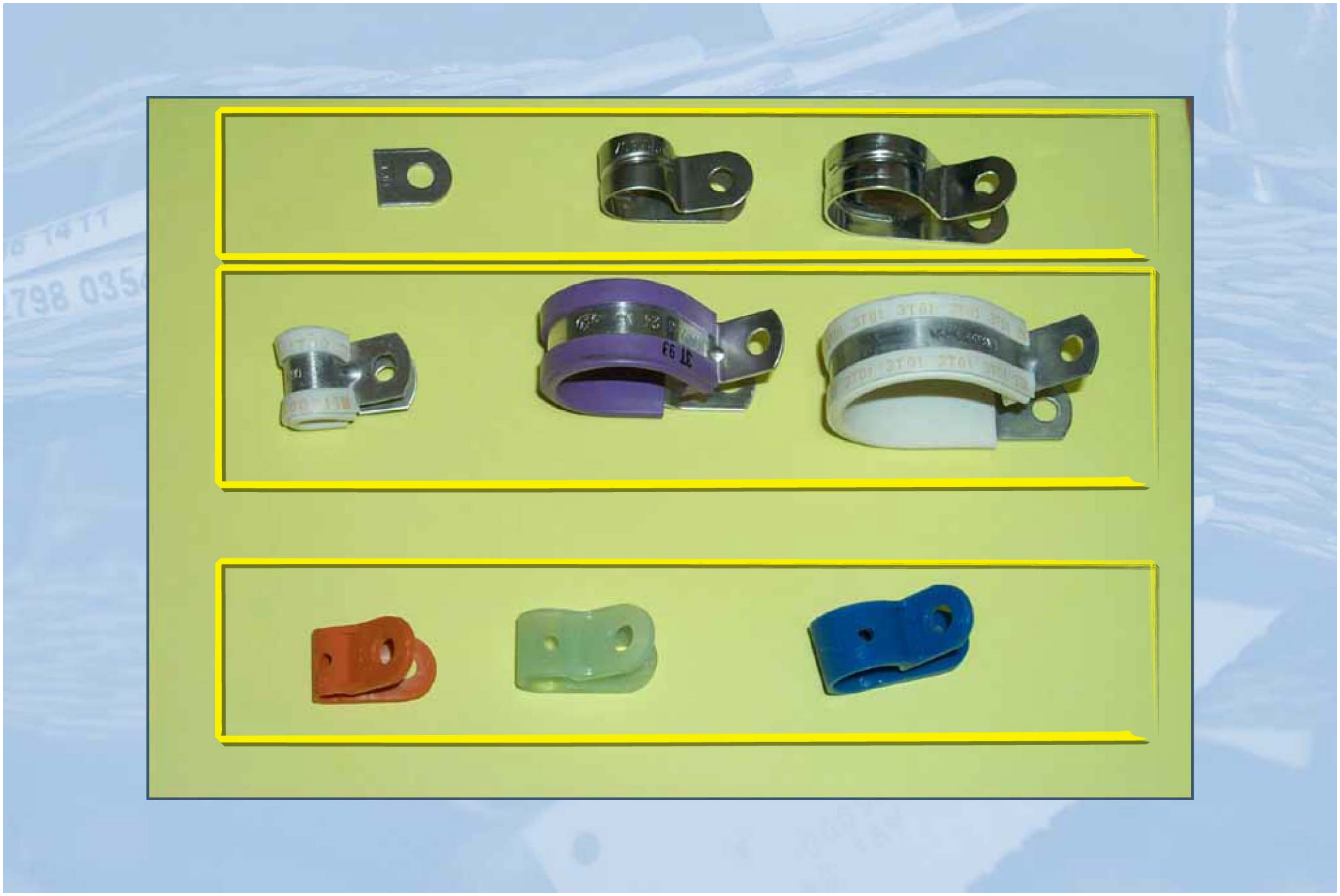
CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM2026000000001



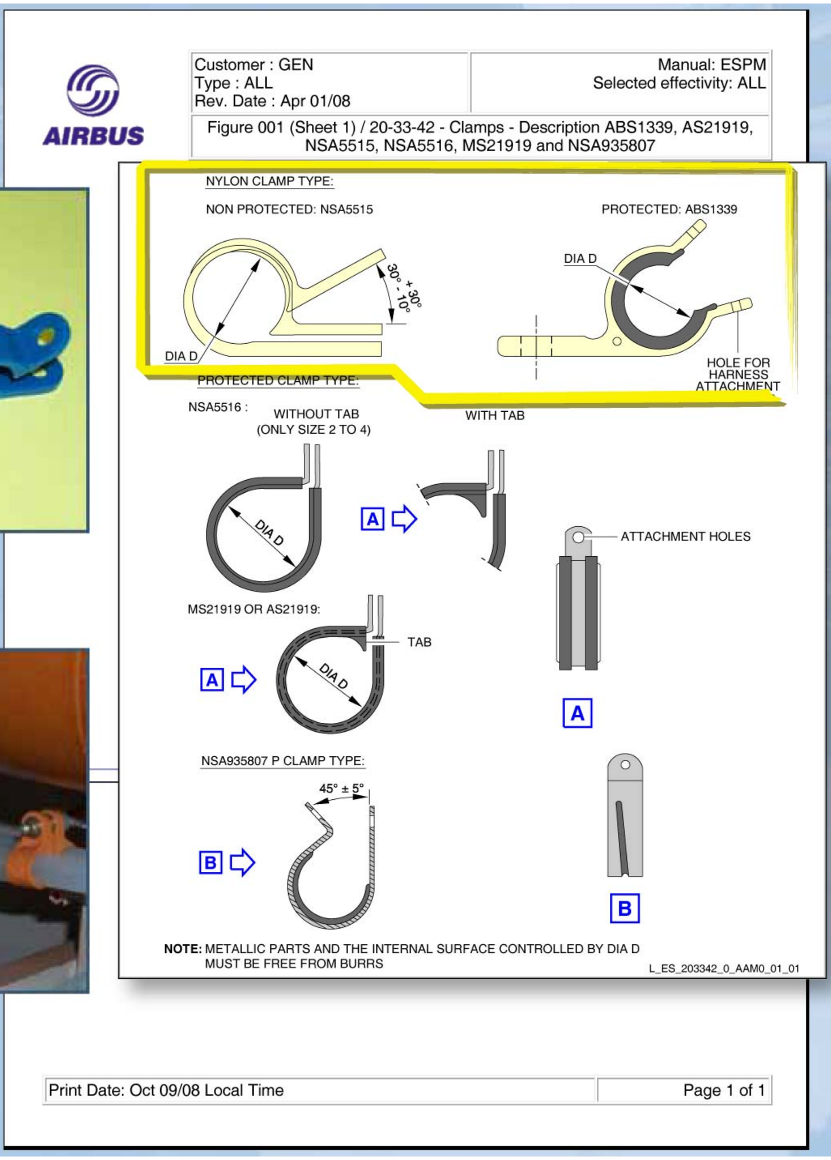
CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM2026000000001



CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM2026000000001



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-33-42 - Clamps - Description ABS1339, AS21919, NSA5515, NSA5516, MS21919 and NSA935807

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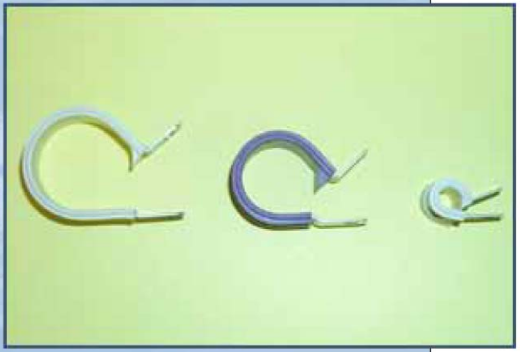
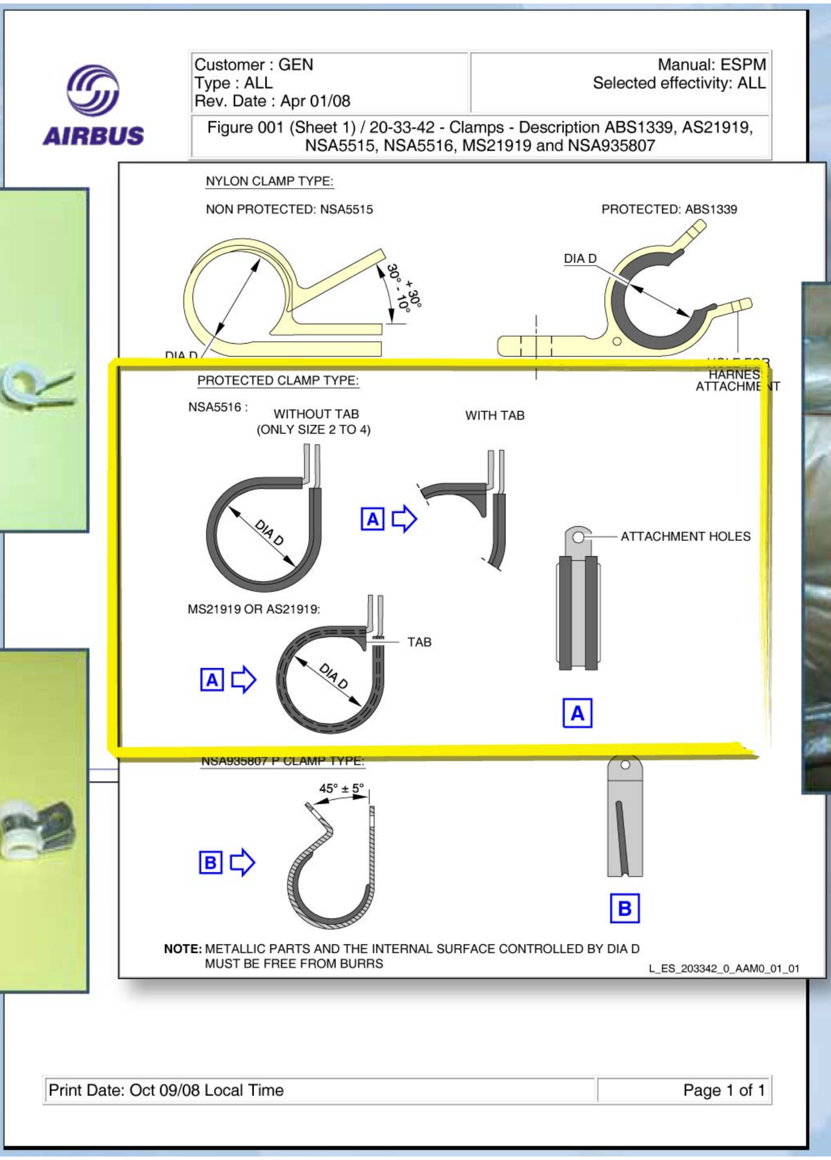
CLAMP AND SUPPORT: REMOVAL AND FITTING

X8U08481 - X0332T0 - XM2026000000001





Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-33-42 - Clamps - Description ABS1339, AS21919, NSA5515, NSA5516, MS21919 and NSA935807

NOTE: METALLIC PARTS AND THE INTERNAL SURFACE CONTROLLED BY DIA D MUST BE FREE FROM BURRS

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CLAMP AND SUPPORT: REMOVAL AND FITTING

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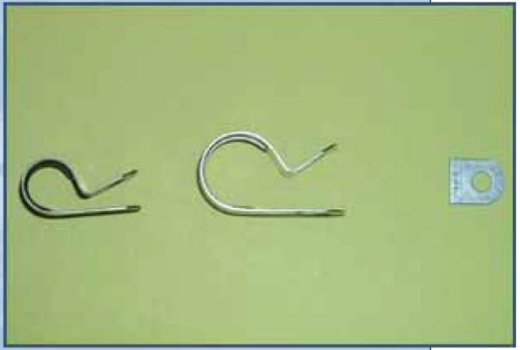
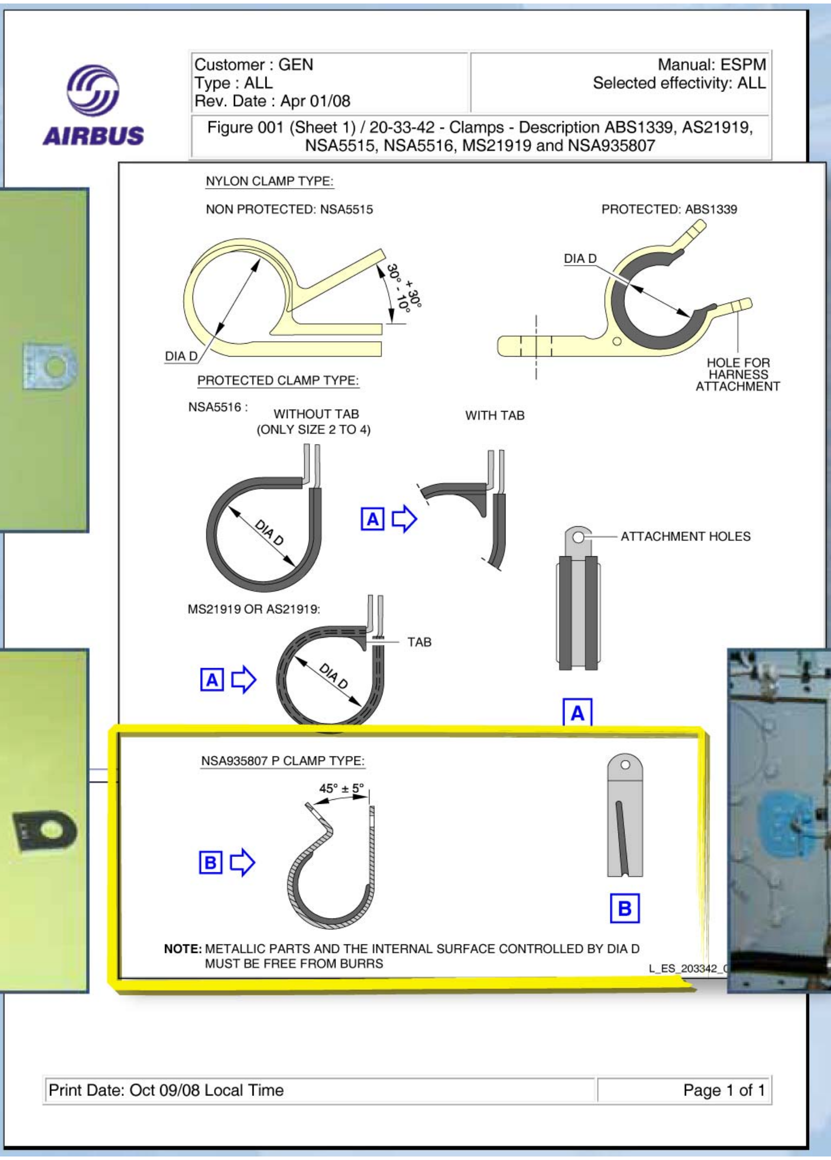
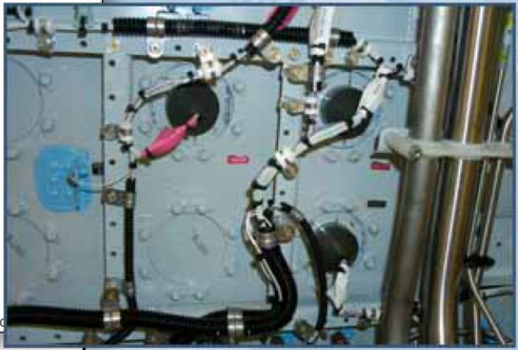
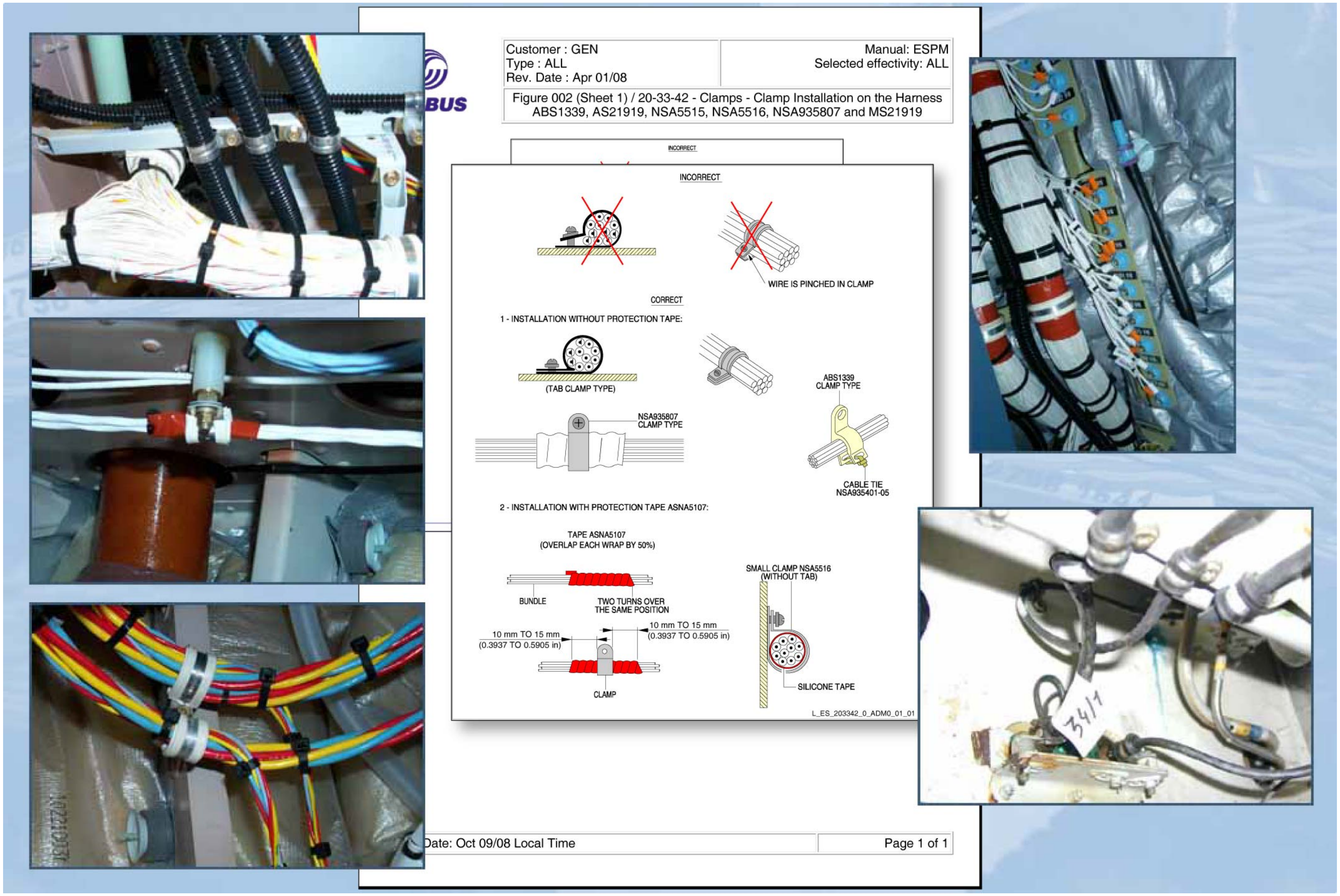


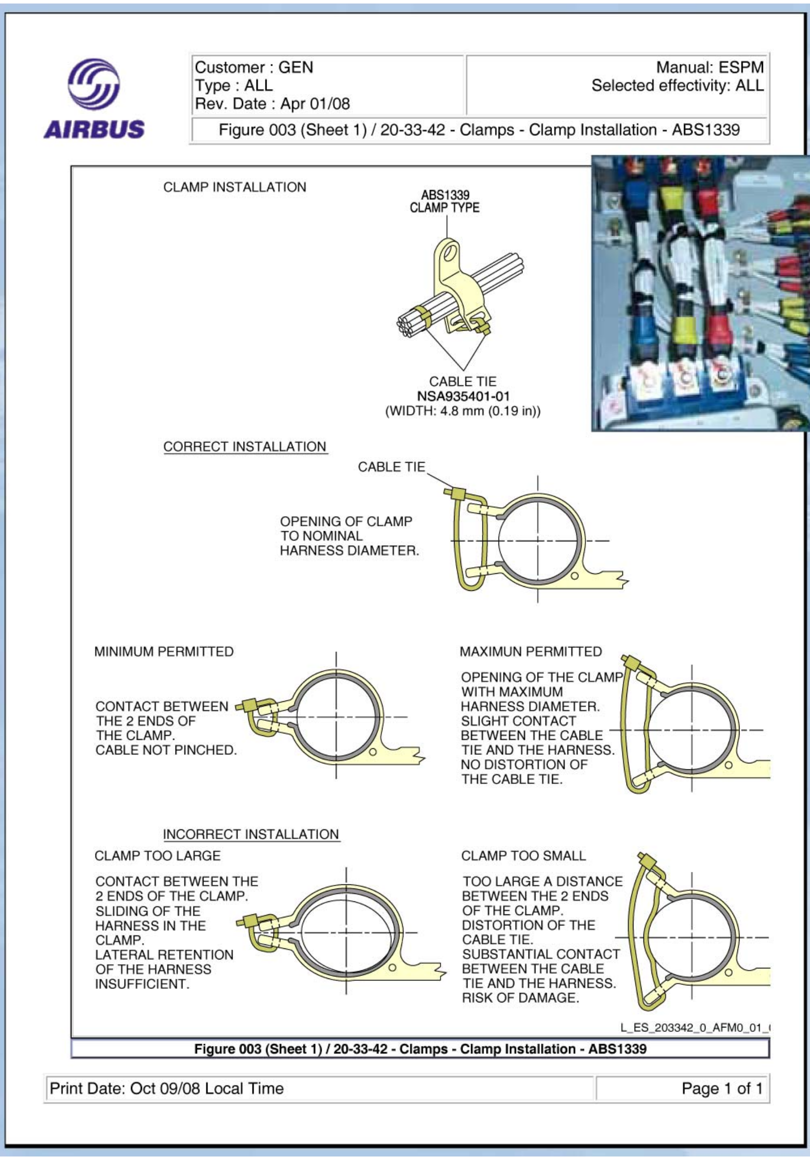


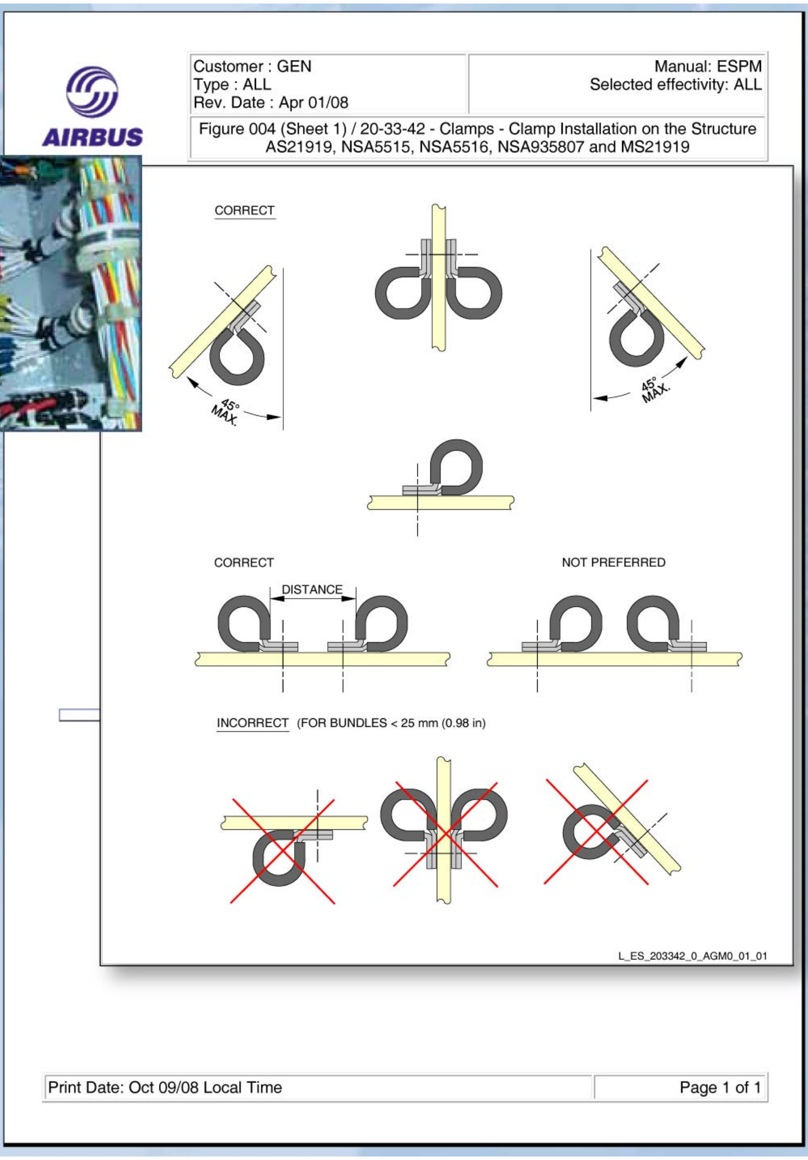


CLAMP AND SUPPORT: REMOVAL AND FITTING

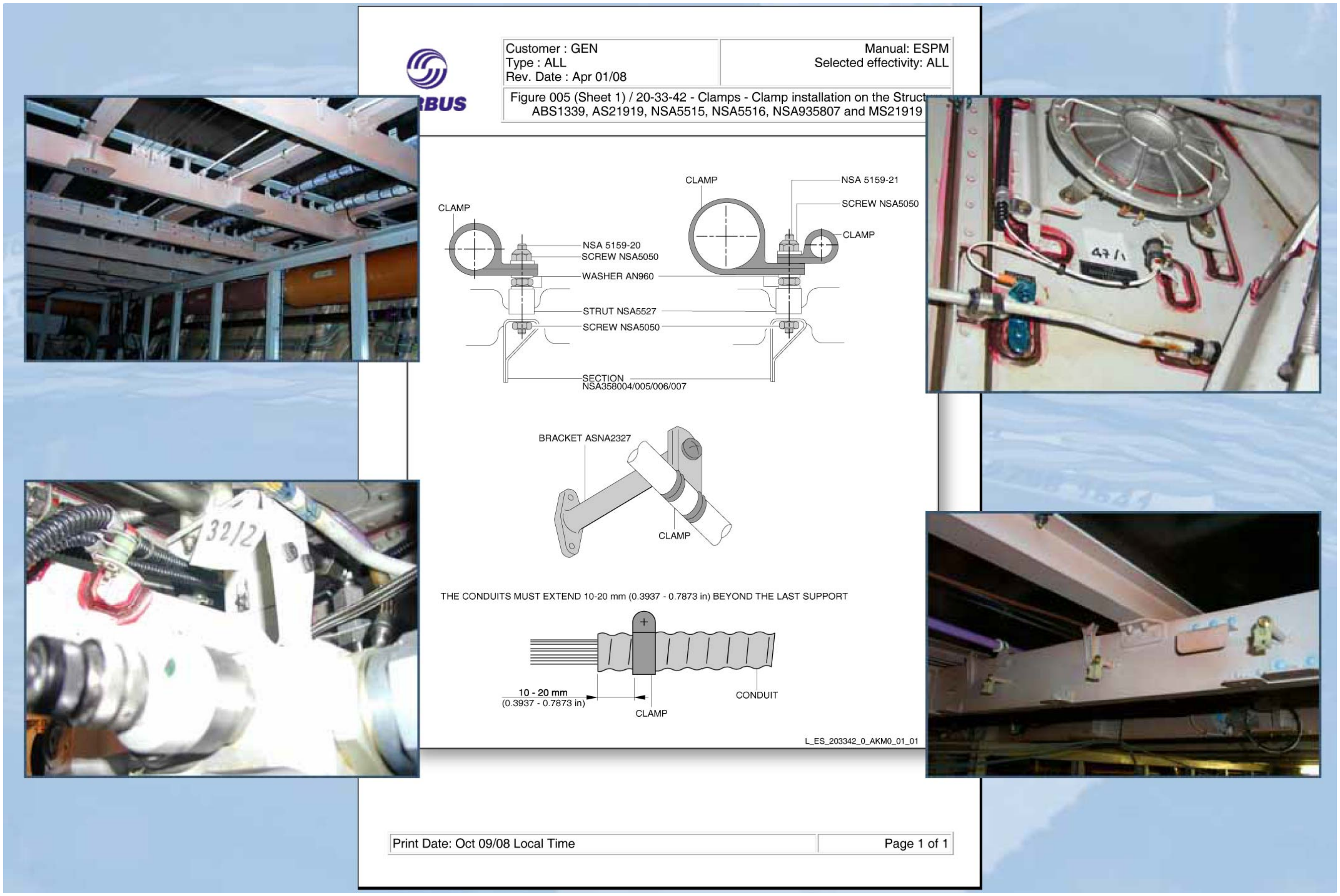


CLAMP AND SUPPORT: REMOVAL AND FITTING





CLAMP AND SUPPORT: REMOVAL AND FITTING



CLAMP AND SUPPORT: REMOVAL AND FITTING

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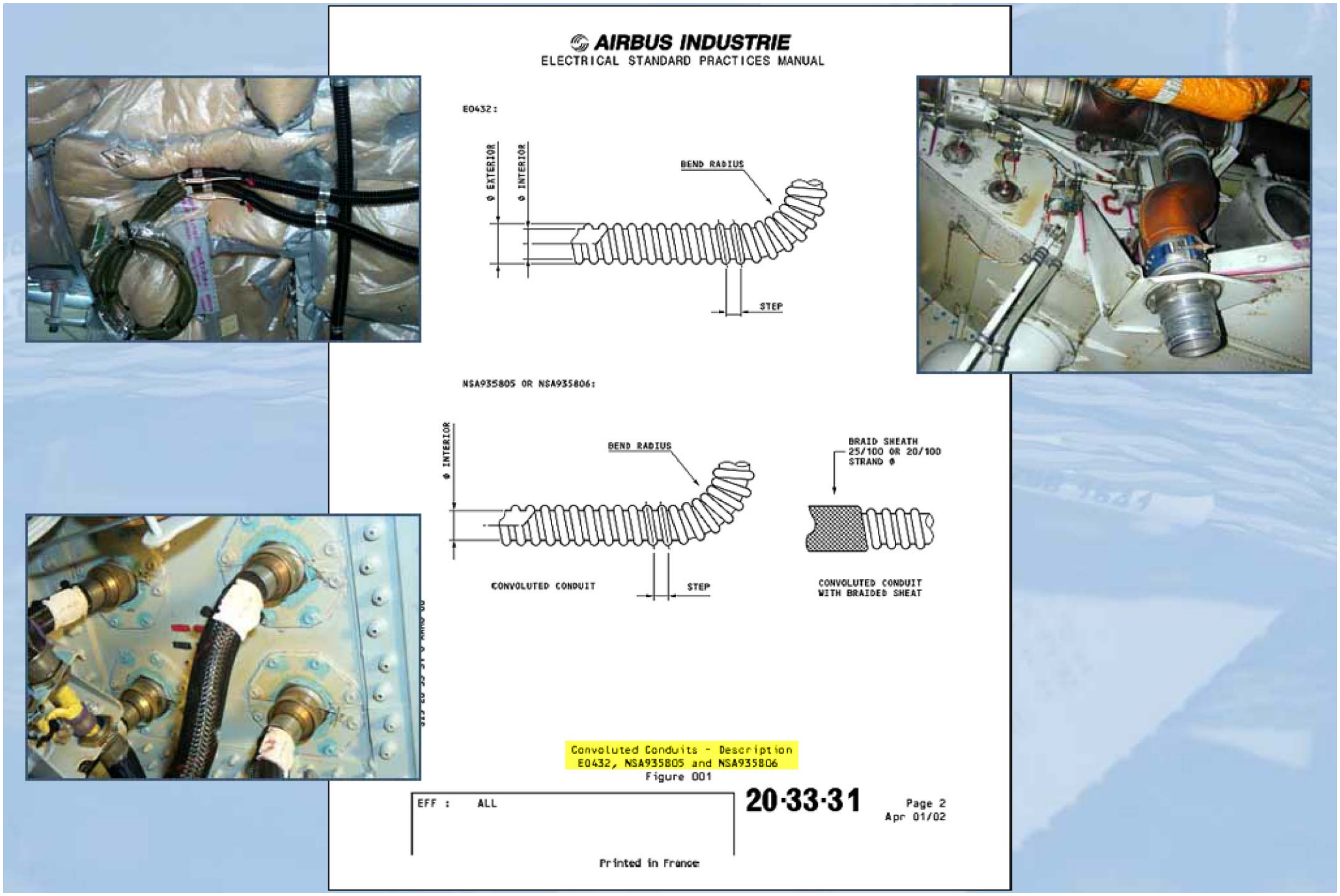
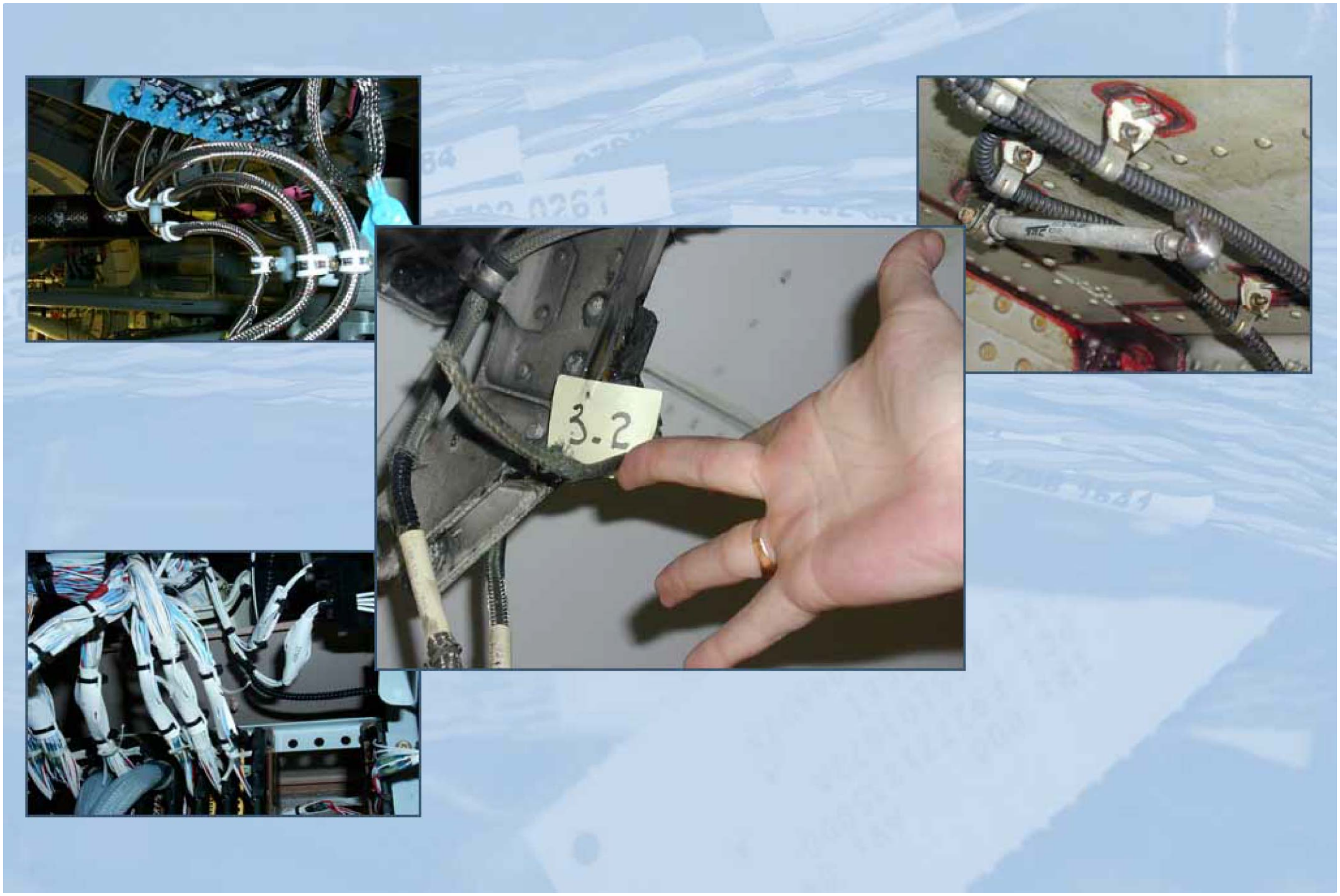
WIRE BUNDLE INSTALLATION PRACTICES

CONDUIT TYPES AND FITTING

Conduit types and fitting
Conduits are used to protect the wires against moisture or structure contacts.
Installation of wires in a conduit.
Never put cable tie inside a conduit.
Draw wires must be installed in conduits of a lenght greater than 50mm (1.9685 in) and where all wires have a disconnecting termination.
Drain holes must be at the lowest part.
Main rules to apply
Main rules on draw-wires.



CONDUIT TYPES AND FITTING



CONDUIT TYPES AND FITTING

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

PROTECTION - DESCRIPTION AND OPERATION

1. General

The wire bundles are routed in such a way that under no circumstances, even temporary, can they come into contact with the structure or adjacent equipment.

In locations where the wire bundles could come into contact with the structure or to ensure segregation rules, bundle protections are provided.

NOTE : For routes consisting of:

- 1 wire of 20 or 22 or 24 gauge (not acceptable for 26 gauge)
- or 2 wires of 22, 24 or 26 gauge,
- or 1 wire of 20 gauge and 1 wire of 22, 24 or 26 gauge.
- The wire or small bundle must be protected at the structural fastener points.

Bundle protections can be of the following types:

- Convoluted conduit type, insulating material (Ref. 20-33-31)
- Metallic conduit type, rigid metal tube with an internal insulation coating or over-braided metal with insulating interior (Ref. 20-33-32)
- Flexible conduit type, textile or elastomer, removable or not (Ref. 20-33-33)
- Shrinkable sleeve (Ref. 20-33-34)

The chapters that follow give the description and requirements related to each type of electrical bundle protection installed on aircraft.

2. Main Rules and Instructions

A. General

When installing electrical cables inside a conduit, the following rules must be observed:

- Use of tie wraps (NSA8420 or NSA935401) inside conduits is prohibited.
- The convoluted conduit must be of one piece. Connection of two conduits to make up required length is unacceptable.
- Make sure there is the draw wire in all conduits whose length is greater than 50 mm (1.9685 in.) (except for conduits shorter than 50 mm (1.9685 in.) and those where all the cables have a disconnectable termination such as connectors, terminal blocks,etc...)
- Make sure there is a drain hole in conduits with a diameter greater than 10 mm (0.3937 in.) with low points (except for conduits located inside pressurized areas, sealed harness, textile and conduit diameter of less than 10 mm (0.3937 in.).

In addition, drain loops (drop of water) are provided to prevent fluid contamination of the connectors (in lavatories, galleys, by leaks from water or hydraulic systems,etc...) Same rule for protected or unprotected bundles.

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CONDUIT TYPES AND FITTING

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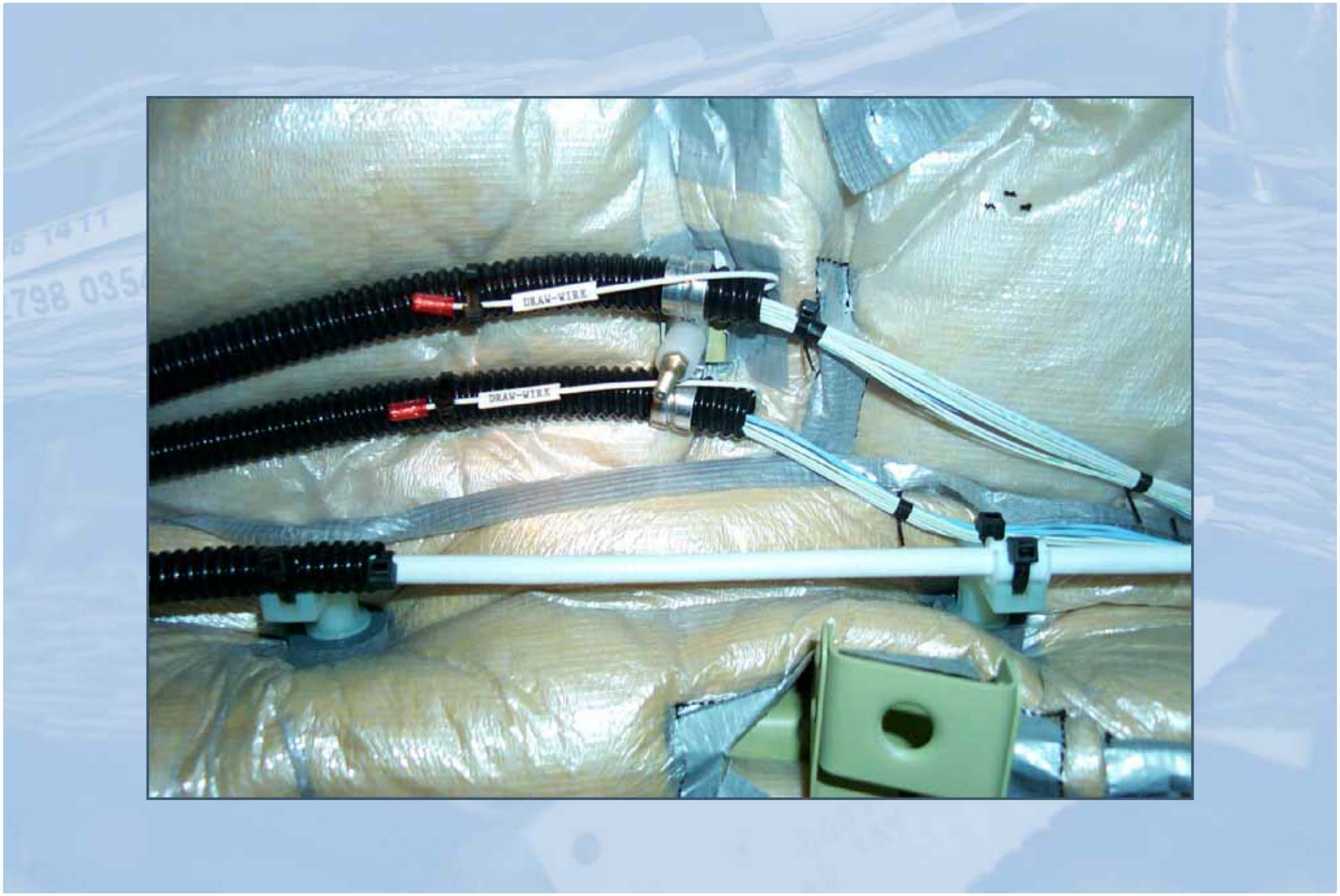
CONDUIT TYPES AND FITTING



CONDUIT TYPES AND FITTING

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AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

PROTECTION - DESCRIPTION AND OPERATION

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CONDUIT TYPES AND FITTING

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-33-30 - Cable Protection - Main Rules	

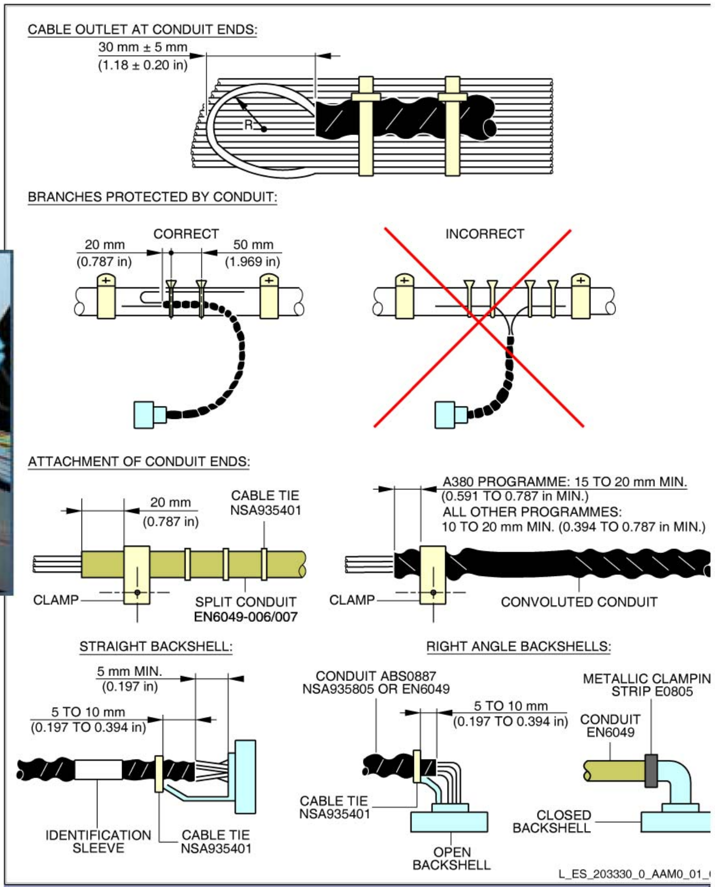

Figure 001 (Sheet 1) / 20-33-30 - Cable Protection - Main Rules

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CONDUIT TYPES AND FITTING

X8U08481 - X0332T0 - XM202600000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-33-30 - Cable Protection - Draw Wire

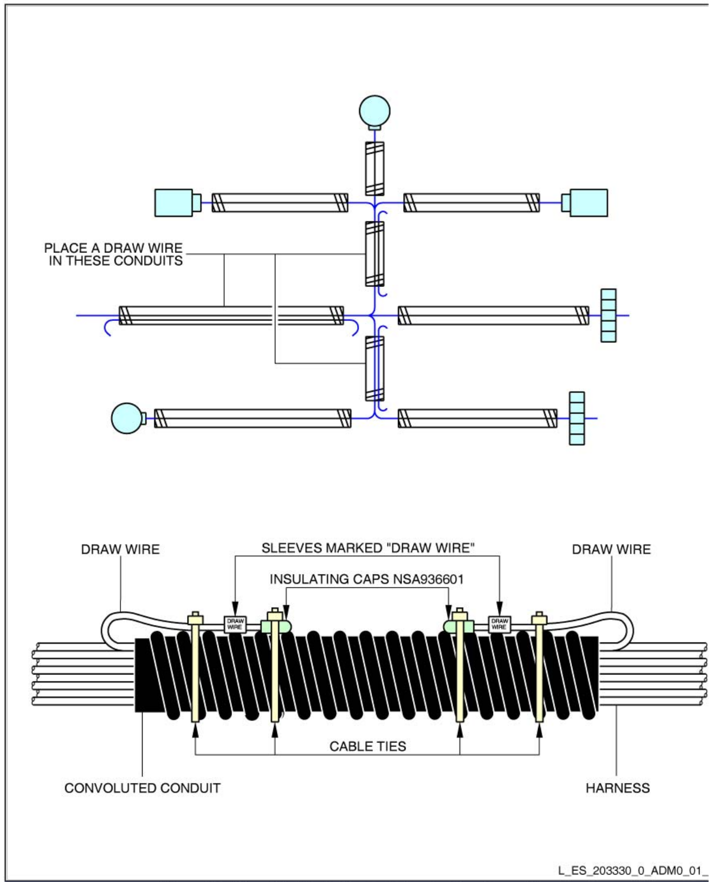

Figure 002 (Sheet 1) / 20-33-30 - Cable Protection - Draw Wire

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CONDUIT TYPES AND FITTING

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WIRE BUNDLE INSTALLATION PRACTICES

RACEWAYS

Installation of raceways.
Two raceways families.
- A320 (ABS 0127)
- A330/340 (ABS 0689)

ABS 0127 (A320 Family) comprises:
- Harpoon tie
- Fairlead
- Retainer

Prior to raceway installation, insert harpoon-ties into the raceways every 150 mm.
Push the harpoon-tie with your hand until the tie-head is fully locked into related hole in the raceway.
Install the raceways by ensuring that each raceway is not visually damaged and is correctly aligned.
Make sure the raceways are not in contact with the structure and that the cables do not chafe on the raceway fins.
Make bounding connections.
All potentially dangerous structural items must be protected before wires installation.
Now, to install the wire, route the wire harness into the applicable raceway channel.
Make sure the wires lie in the raceway without being tensioned or twisted.
Make sure the wires are in equal quantities on each side of the harpoon-tie.
Make sure there is no loop inside the raceway channel.
When all the cable retention devices have been installed, the tails of the ties must be attached with the use of a tension tool.
Detailed procedure in the ESPM.
For the ABS 0689 (A330/A340 Families) the raceways comprise:
- Retainer bridge ABS0689-A
- Pressure pad ABS0689-B

Installation of raceways.
To correctly align a raceway with another, (in height) use washers.
If it is not possible to fully align the raceways (with a gap greater than 6 mm), the cable harnesses are to be equipped with shrink sleeves.
Cable installation.
Route wires in the applicable channel.
Make sure the wire lies correctly in the channel (not twisted and no tension)
When all the wires are routed, install the retainer bridge on the raceways.
The retainer bridges are supplied with a "nose" which must be installed and pointed upward.
When all the bridges have been installed, press the pads into the retainer bridges so that the wires are properly attached in the raceway channel.
During all the installation procedure, you must make sure that the insulation of the wire is not damaged and the wires are not between the pressure pad and the raceway channel wall.

TWO RACEWAYS FAMILIES

A330/340 (ABS 0689)

A320 (ABS 0127)

RACEWAYS

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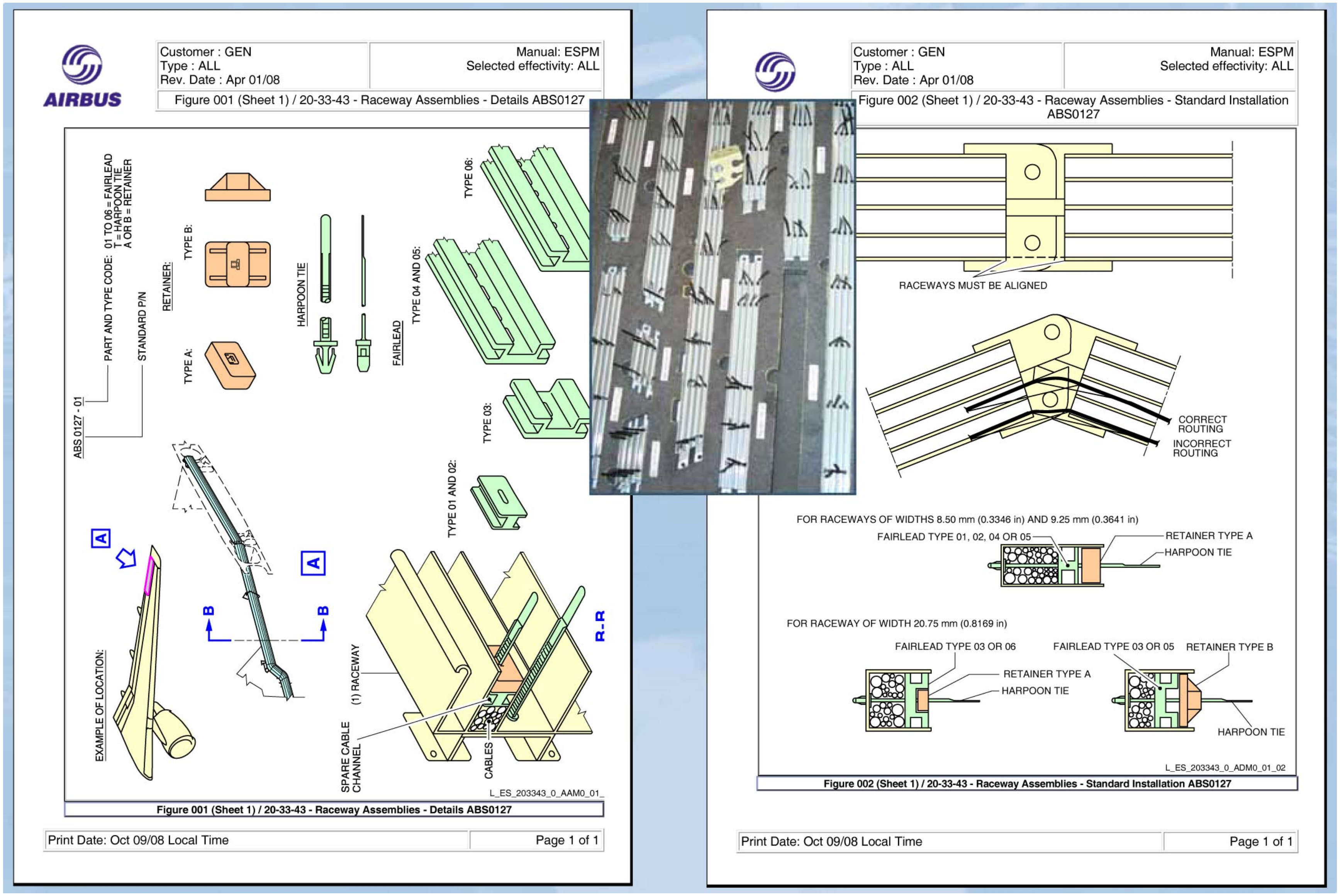

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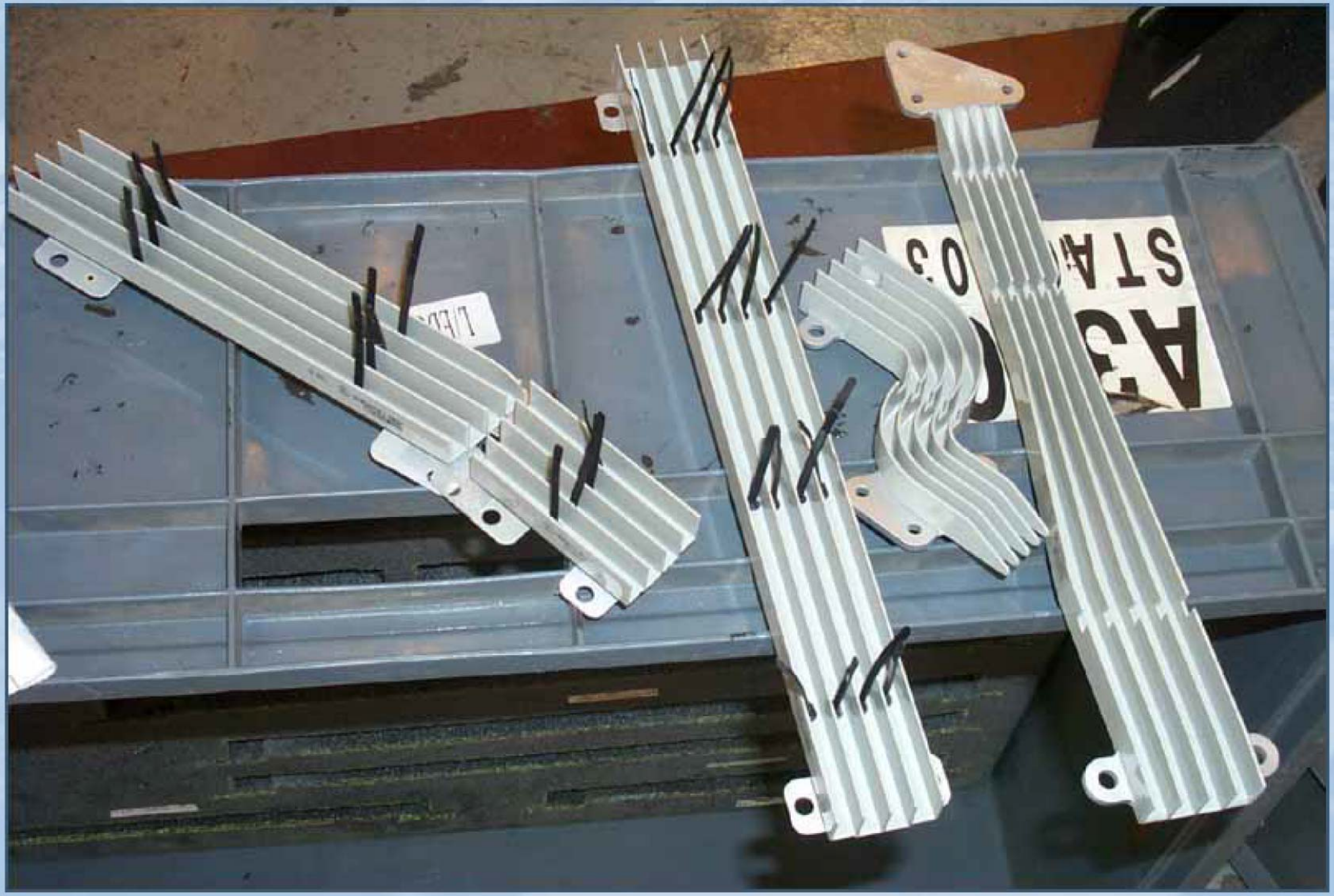

RACEWAYS

RACEWAYS

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RACEWAYS

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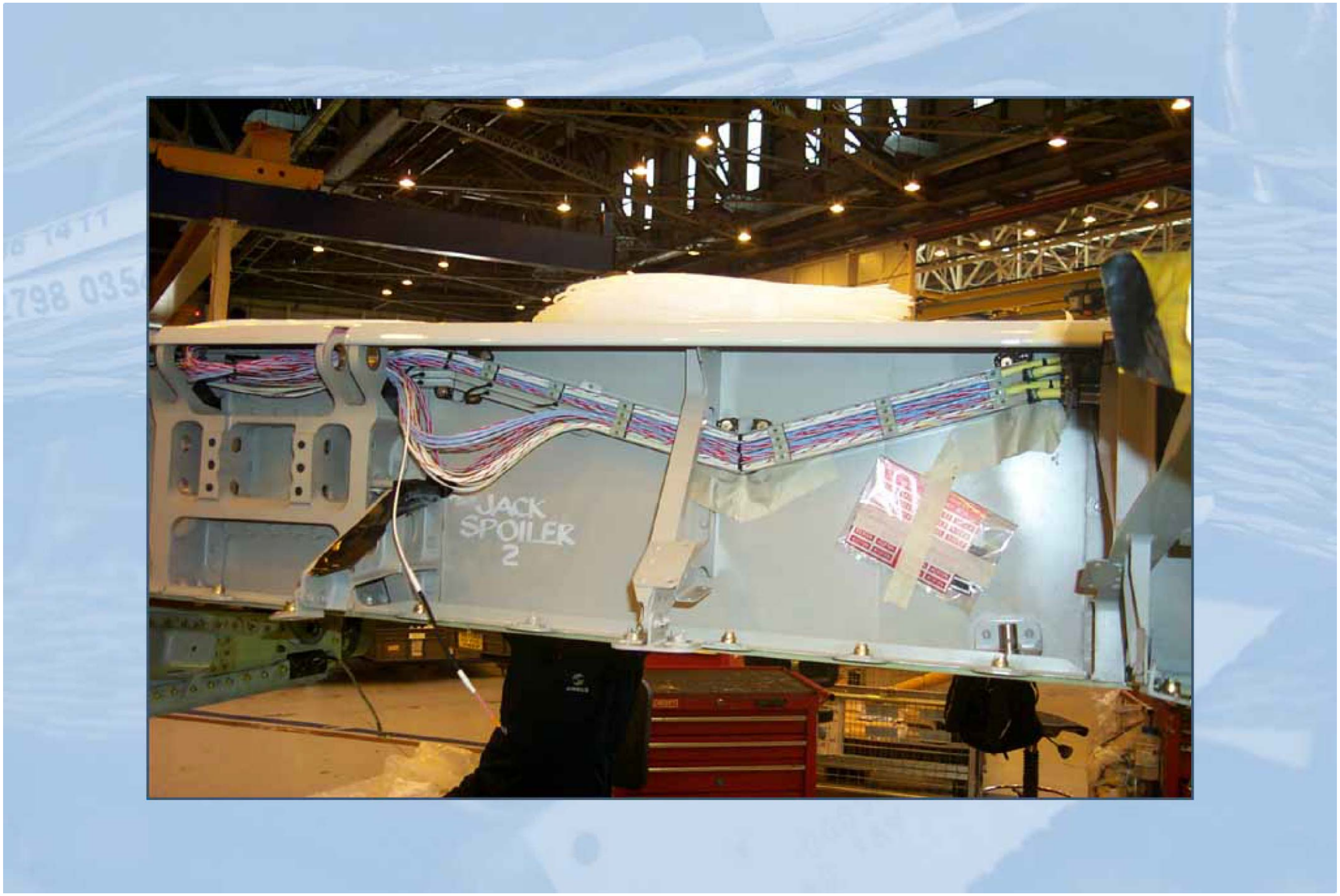

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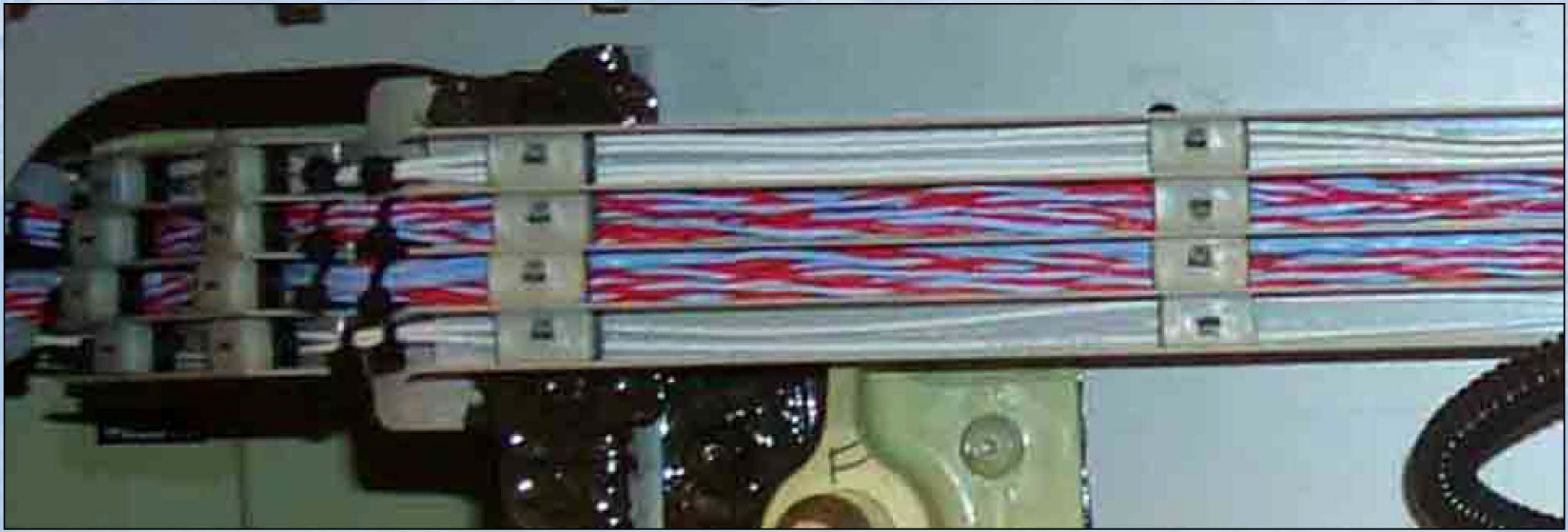

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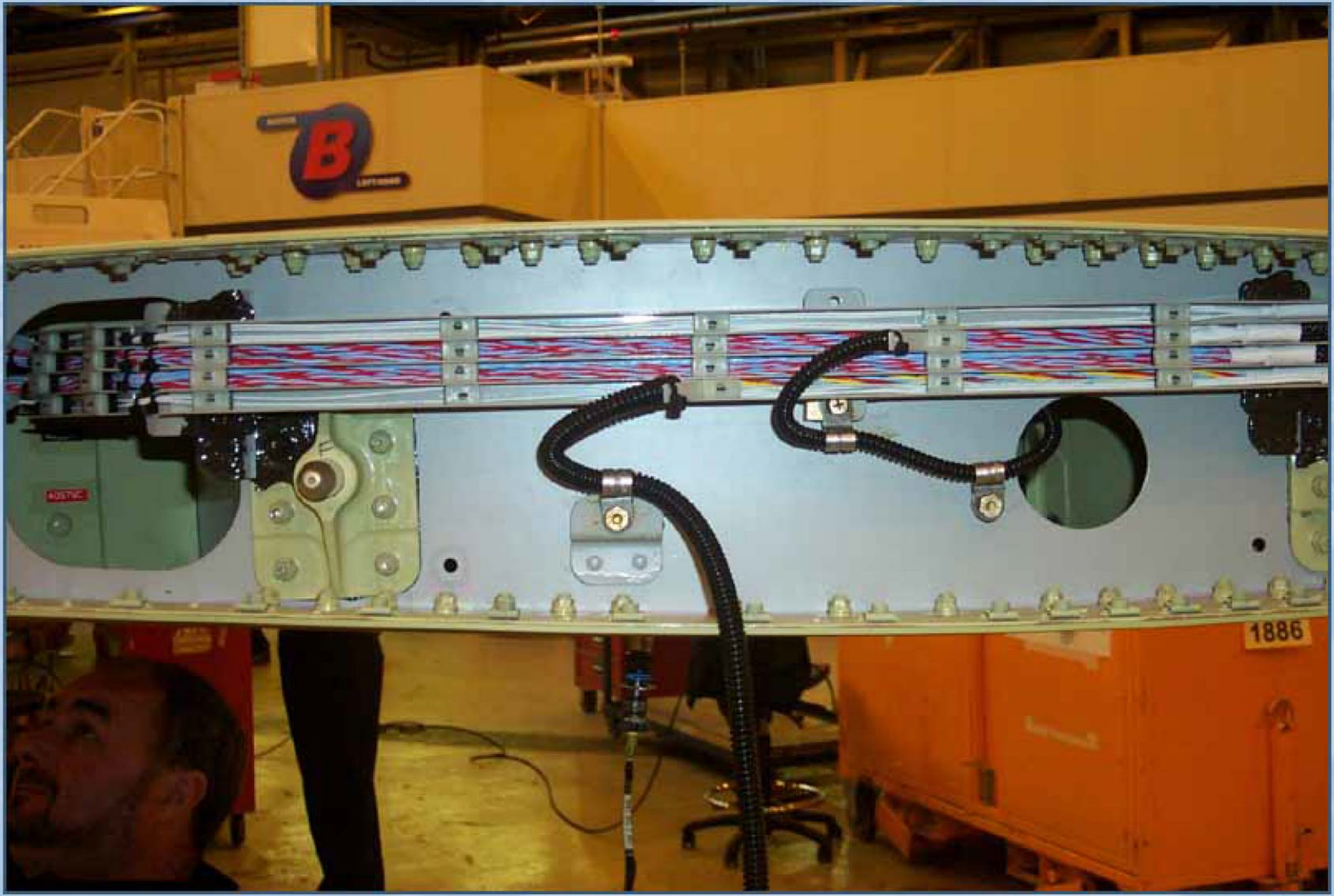

RACEWAYS

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PART AND TYPE CODE	DESIGNATION	COLOUR
01	FAIRLEAD	BLACK
02	FAIRLEAD	NATURAL
03	FAIRLEAD	NATURAL
04	FAIRLEAD	BLACK
05	FAIRLEAD	NATURAL
06	FAIRLEAD	NATURAL
A	RETAINER	NATURAL
B*	RETAINER	NATURAL
T	HARPOON TIE	BLACK

* Retainer B is an optional locking device for use with type 03 and 05 fairleads only.

C. Installation procedure

(1) Installation of harpoon-tie
- Prior to the raceway installation insert harpoon-ties into the raceways at each end. First at each end and after, at pitches max. of 150 mm (5.9055 in.).
- Push the harpoon-tie with your hand until the tie-head is fully locked into its related hole in the raceway.

(2) Installation of raceway
(Ref. Fig. 002)
- Install the raceways ensuring that each raceway is not visually damaged and that they are aligned correctly. Make sure the raceways
R do not touch the structure and that the cables cannot chafe the
R raceway fins.
- Make bonding connections. The coating must not be removed. Probe the foot of raceway only during bonding checking.
- Over seal joints, the bolt threads must be dipped prior to assy where rear overcoating is impossible.
- All potentially dangerous structural items must be protected prior to the installation of the harness (if necessary install cap ends at every raceway fin end).

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RACEWAYS

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(3) Installation of cables in raceways
(Ref. Fig. 002)
- Make sure that the harpoons are secure in the raceway.
R - Route the cable harness in the applicable raceway channel.
Make sure that the fill factor is not exceeded (max. 65 % in trailing edge or 80 % in leading edge).
Take great care to prevent damage to the cables.
Make sure that all the cable harnesses lie in the raceway channels without being tensioned or twisted.
No loops must have formed in the electrical cables.
Make sure that the cables are not snagged in the raceway.
- Make sure cables are equalled out either side of the harpoon ties.
- Take care that :
The insulation of the cables must not be damaged or deformed.
The cables must not lie between the pressure pad and the raceway channel wall.
R If a raceway channel has no cable inside, do not install the
R pressure pads in the channel.
Take care not to damage the surface protection.

NOTE : No repair with splices is authorized in the raceway.
When a cable is damaged or broken, the standard procedure is to replace it with a cable that has the same P/N.
For more data Ref. Chapter "electrical wire repair / 20-53-2x".

- Retain the loom in the raceway using the appropriate type of fairlead.
Insert it on the tail of the harpoon tie until it rests on the cables. Attach it by inserting a retainer onto the tail of the tie until the cables are correctly held by the fairlead.
Make sure the retainer has been inserted in the correct direction so that it is locked and cannot be removed. Do not remove the excess tail of the harpoon tie at this stage.
- When all the cable retention devices have been installed, the tails of the ties shall be attached using an extended neck tension tool selected to the appropriate tie setting. When the retention devices have been attached remove the tails with cutters.
- Make sure that :
R No foreign objects remain in the raceway (e.g. cut off residues of
R harpoon ties).
After each channel has been loaded with cables and attached with harpoon ties, fairleads and retainers, examine the looms to make sure they remain in position in the channel throughout their length.

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(4) Replacement of harpoon tie
(Ref. Fig. 001, 002)
- Great care shall be taken at all times during the replacement of raceway ties.
This will usually require the removal of an existing tie.
- Removal will usually require the cutting through of the located harpoon tie head, which is probably best carried out by the use of sidecutters. Since most harpoon tie heads are located in generally inaccessible positions, make sure that when the applicable head is being cut that adjacent harpoon heads are not damaged. Cutting tools do not damage the raceway or other surface treatments.
- When the harpoon tie head is removed, do not try to pull the harpoon tie tail from the loom without first parting the cables to assist the passage of the tie platform at the base of the tie.
- Maintain the parting of the cables to facilitate the re-entry of the new harpoon tie into the loom and the raceway.
- Discard the old retainers and fit new ones.
- When it is impossible to sever the head of the harpoon tie by the previous means, the only method to release the retainer and fairlead is to use a thin-bladed implement :
- Insert a thin-bladed end between the latch of the retainer and the indentation of the harpoon tie tail and then gradually remove the retainer up the tail.
- Remove and discard the retainer.
- Remove and discard the fairlead.
This method requires the portion to still be in the raceway and must be reused. Therefore it is important that damage is not caused to the indentation in the tie.
A normal application tool cannot be used to tighten the new fairleads and retainer on the reassembly because the tail is already removed.

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RACEWAYS

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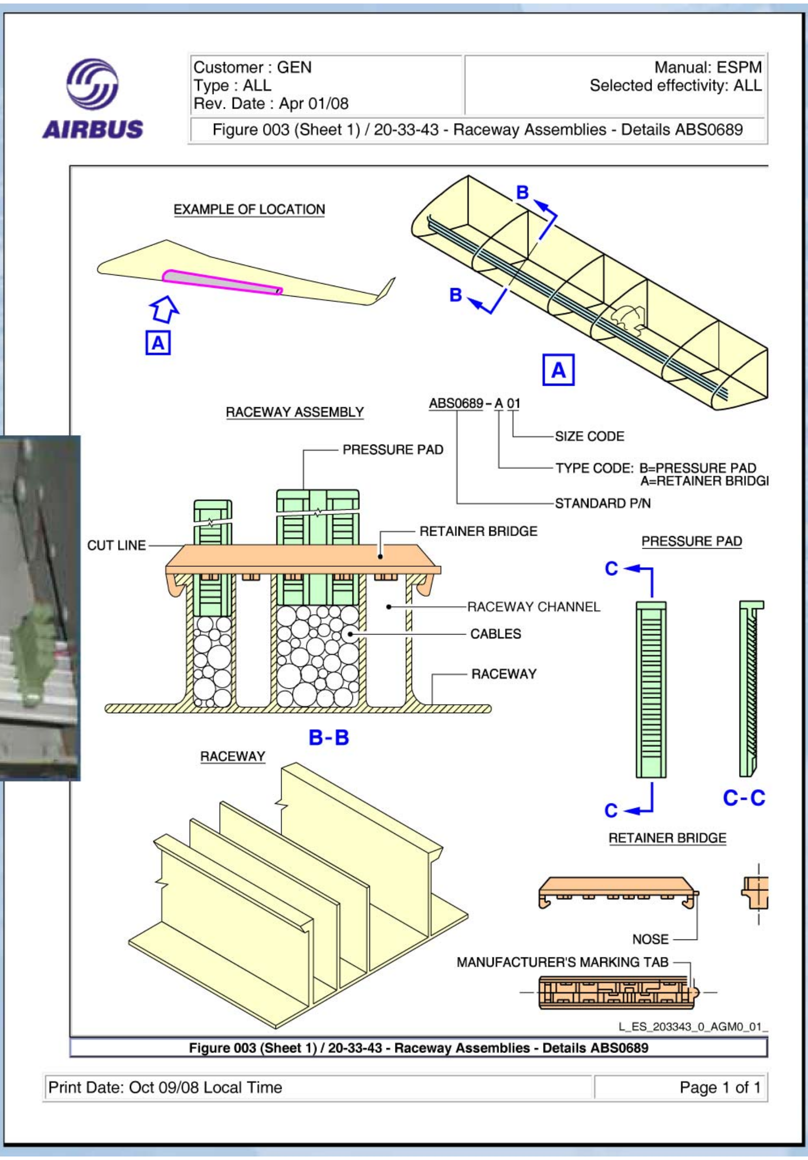

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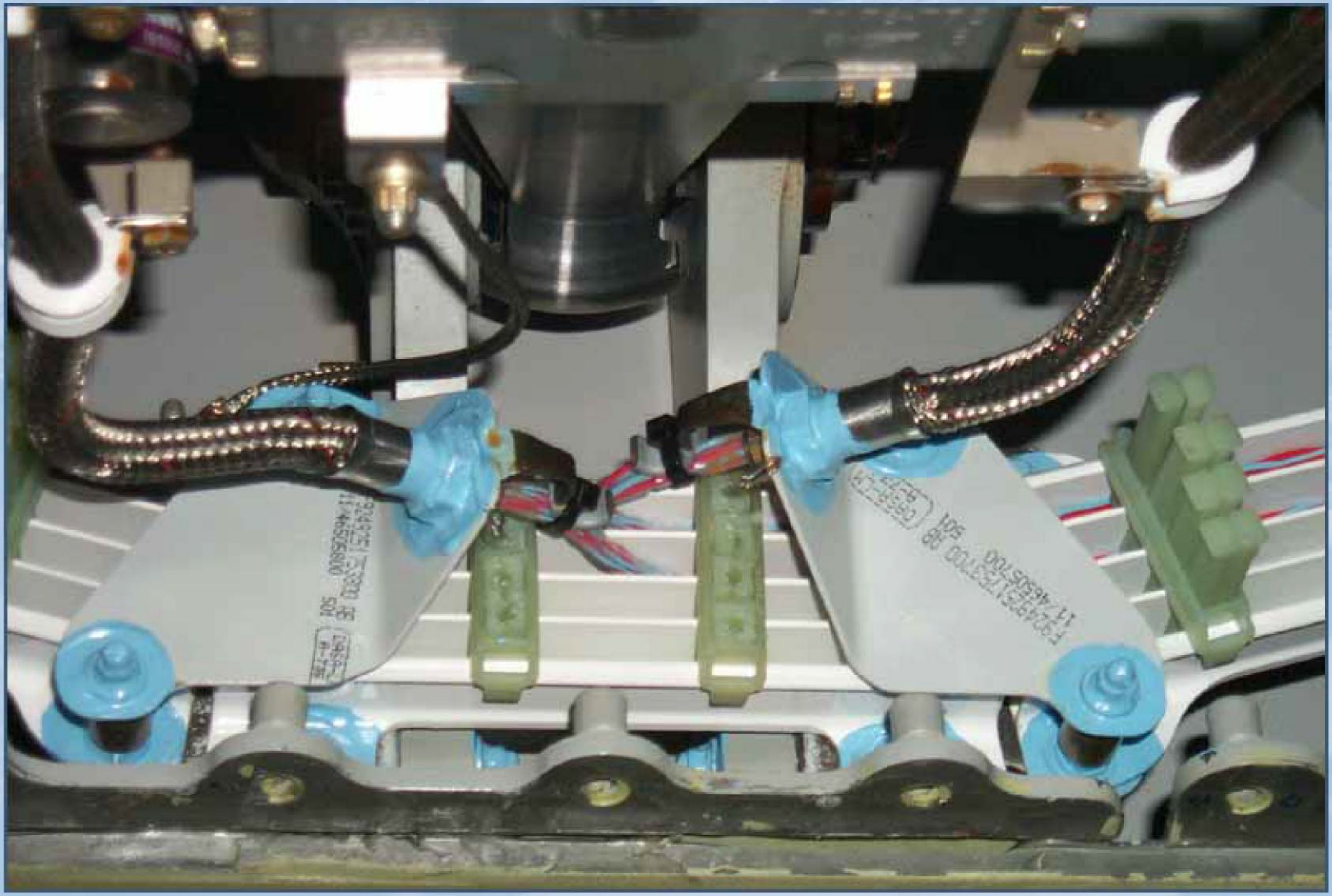

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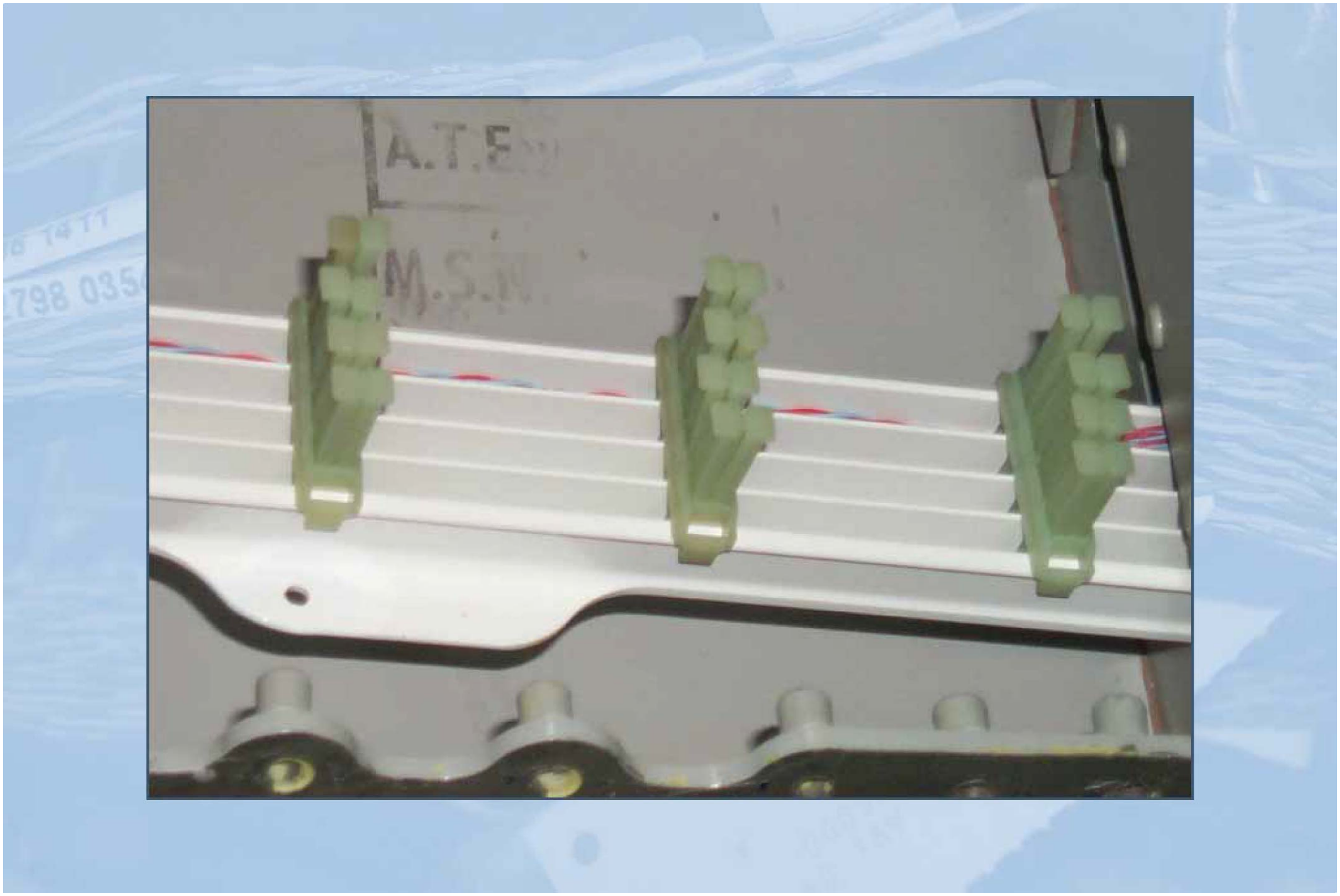

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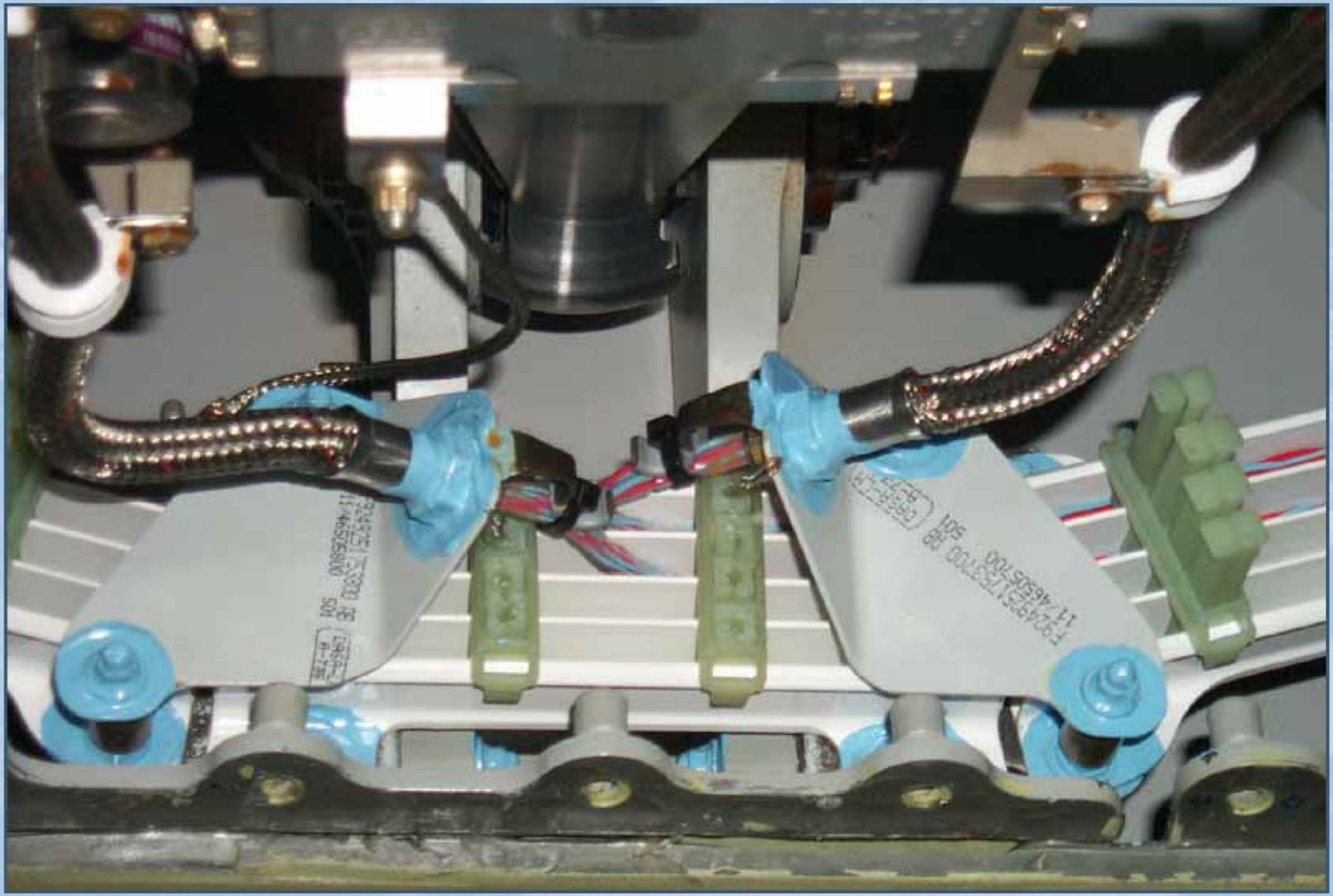

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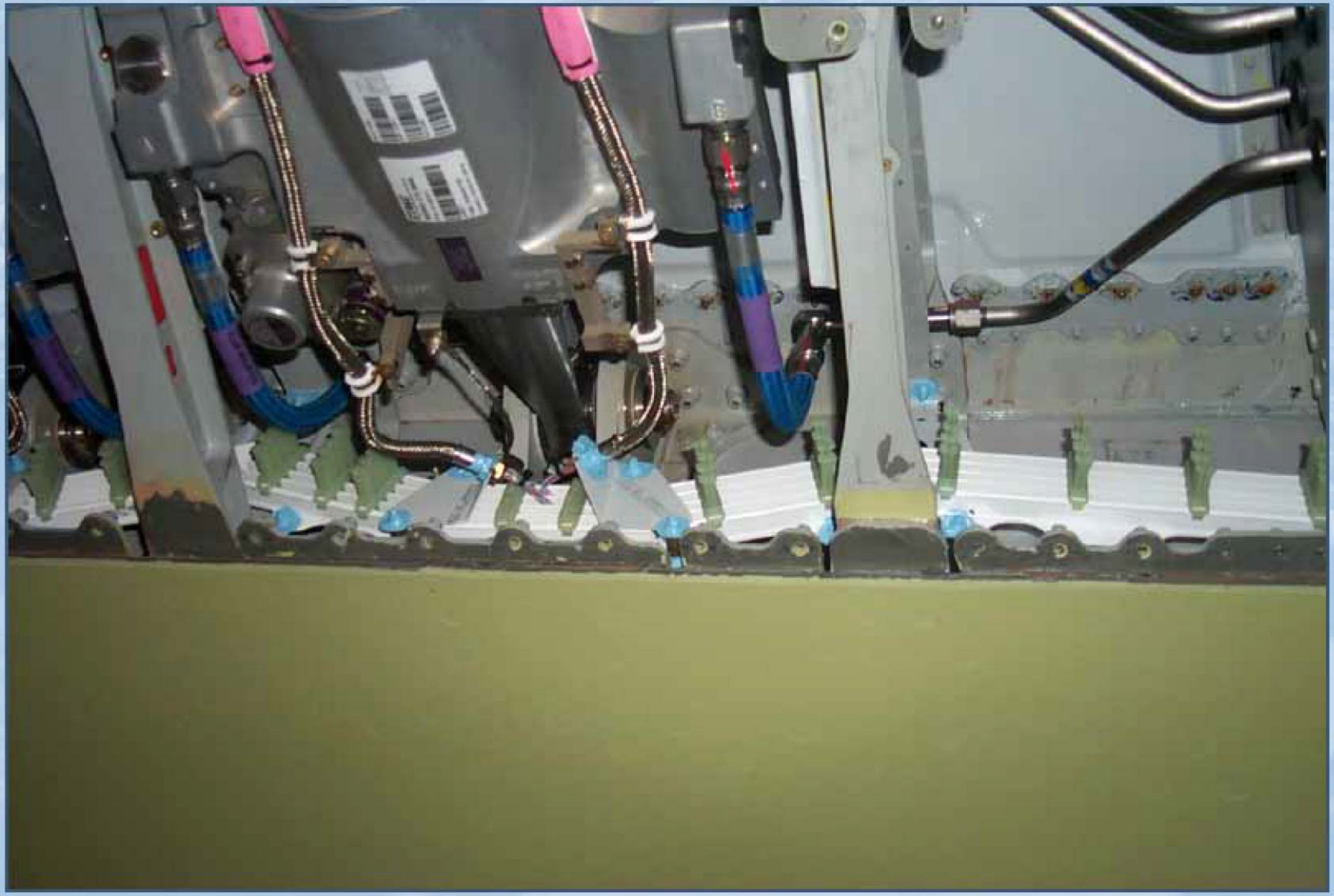

RACEWAYS

RACEWAYS

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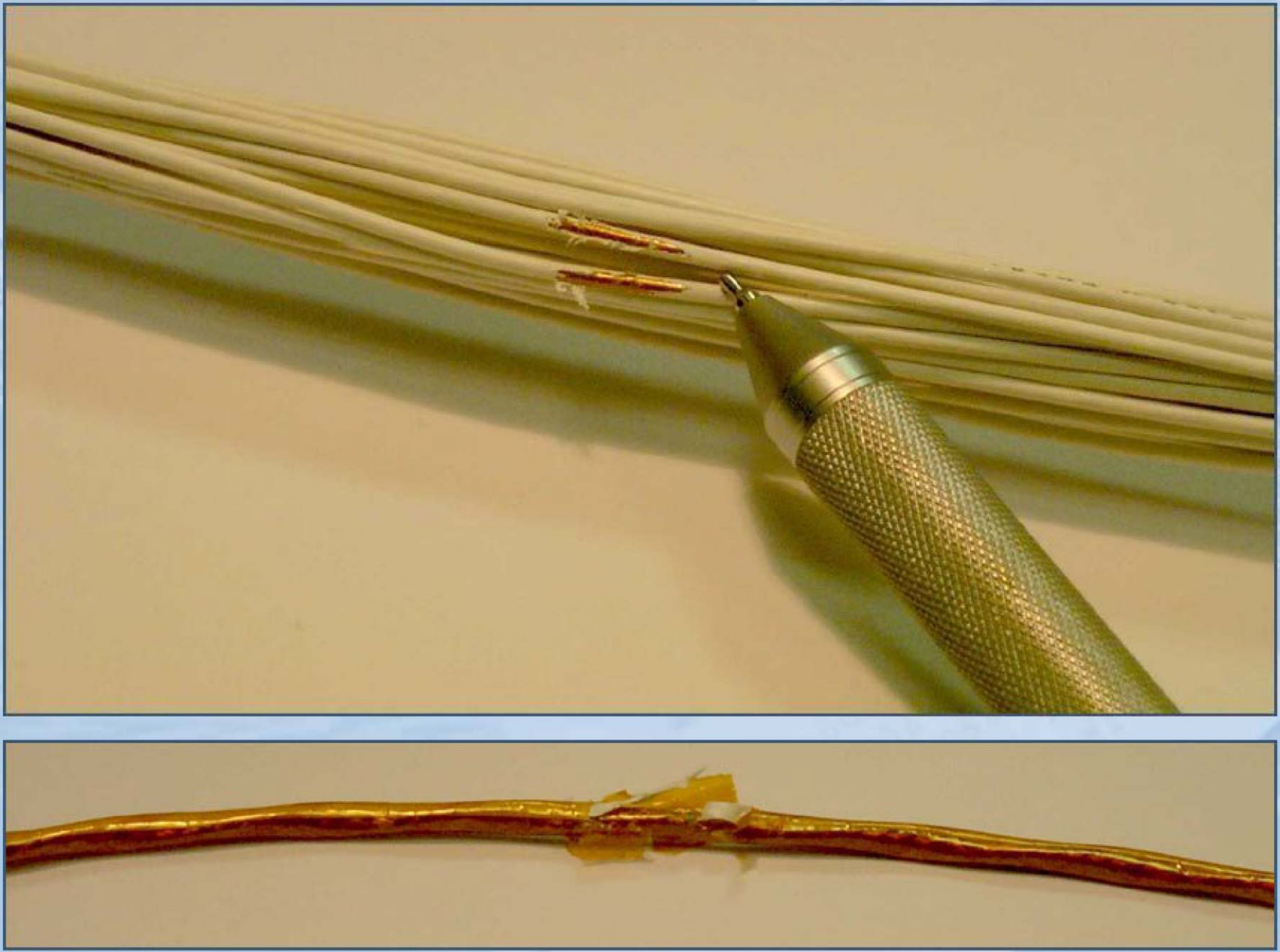
MAINTENANCE AND REPAIR PROCEDURES

WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

Damage assessment.
Correlate the damage found with the table.
Correlate the damage found with the table.
Example of damaged wire.
Correlate the defect with the table.
Coating and sheath damaged.
Repair to perform: 2-A.
Method 2-A: Wrap with material n° 05-116.
Further wrapping details located in 20-53-29.
Detailed repair procedure.
Damaged CF wire.
Core damaged.
Repair 1-C.
Repair explained in this table.
Allocation table for splice and for sleeve.
Example of a repair by sleeve on a damaged insulation.
No damaged strands but they are visible.
Prepare sleeve at a sufficient length.
Insert the sleeve on the wire.
Retract the sleeve.
Sleeve fully retracted.
The principle for retrieving information for a wire repair is based on the same philosophy. To find the appropriate repair chapter, you can refer to the HOW TO USE Chapter of the E.S.P.M. (00-INTRO).
How to use :
Define the wire to repair.
Step 1 :
Consult the index.
Step 2 :
Correlate your wire type with the appropriate sub chapter.
How to find the appropriate repair procedure.
Define the repair procedure.
Consultation of the repair procedure table.
How to find the correct sleeve.
How to define the splice.



WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

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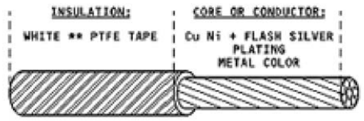
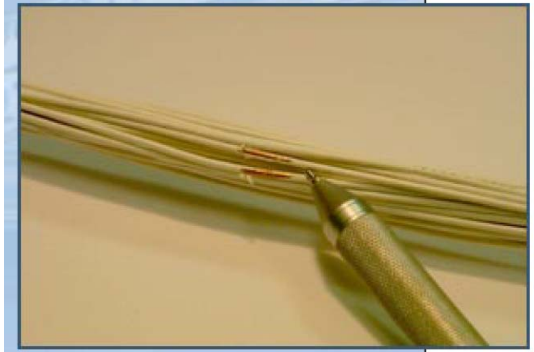
TYPE: BE, BF



**IN SOME CASES, THE INSULATION CAN HAVE A DIFFERENT COLOR



DAMAGE LOCATION	DAMAGE ASSESSMENT	GRADE	REPAIR TYPE (ORDER OF PRIORITY)
INSULATION:	-SURFACE NICKS IN PTFE: YOU CANNOT SEE THE CORE -DEEP NICKS IN PTFE: YOU CAN SEE THE CORE BUT IT IS NOT DAMAGED	4	REPLACE THE CABLE
CORE:	-DAMAGED STRANDS OR CUT CORE: YOU CAN SEE THE COPPER (NICKEL DAMAGED) OR THE STRANDS ARE CUT	4	REPLACE THE CABLE

REPAIR CLASSIFICATION:

GRADE 0:NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1:PERMANENT REPAIR
GRADE 2:A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK (REFER CHAPTER 20-52-10).
GRADE 3:TEMPORARY REPAIR ONLY, REPLACE WITH NEW WIRE IN ACCORDANCE WITH THE BASIC DEFINITION AT SUBSEQUENT C-CHECK.
GRADE 4:NO REPAIR IS PERMITTED (REPLACE THE WIRE).

S15 20 53 21 0 AANO 01

Layout and Table for Damage Assessment
BE and BF
Figure 001

EFF : ALL

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WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

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REPAIR OF SCREENED CABLES - DESCRIPTION AND OPERATION

1. General

This chapter gives the technical requirements for repair of the cables.

- Single-Core or Multi-Core Cables, Screened, Low-Temperature, Extruded Insulation

  These cables installed on aircraft have P/Ns:

  E0289 YZ
  E0300 HG
  NSA935172 SFA/SFB
  NSA935212 TJA
  NSA935214 TJB
  NSA935252 UKA
  NSA935253 UKB

- Single-Core or Multi-Core Cables, Screened, Low-Temperature, wrapped Insulation

  These cables installed on aircraft have P/Ns:

  ABS0386 WF
  ABS0682 MG
  E0270 SJ/SJ-C/SJ-U
  E0272 TK/TK-C/TK-U
  E0274 UD/UD-C/UD-U

- Single-Core or Multi-Core Cables, Screened

  These cables installed on aircraft have P/Ns:

  ABS0124 VR
  ABS0323 VJ
  E0263 HB
  E0271 ST/ST-U
  E0273 TT/TT-U
  E0275 UE/UE-U
  E0286 YF
  E0287 HA
  E0292 HC
  E0529 HP
  NSA935171 SE
  NSA935211/213 TG
  NSA935251/254 UG
  NSA935293 YD
  NSA935298/306 YK
  NSA935307 YT

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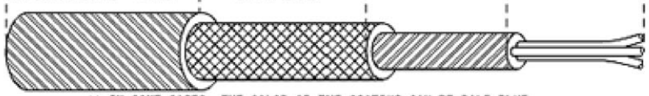
TYPE: SJ, SJ-C, SJ-U, TK, TK-C, TK-U, UD, UD-C, UD-U, MG, WF



** IN SOME CASES, THE COLOR OF THE COATING CAN BE PALE BLUE.

DAMAGE LOCATION	DAMAGE ASSESSMENT	GRADE	REPAIR TYPE (ORDER OF PRIORITY)
COATING:	-SURFACE SCRATCHES IN OUTER COATING: YOU CAN SEE POLYIMIDE BUT IT IS NOT DAMAGED -CASE OF CO2 LASER CABLE: YOU CAN SEE THE DARK COATING YOU CAN SEE POLYIMIDE THROUGH THE TRANSPARENT BUT FOR (EXCEPT WF TYPE) THE COATING IS NOT DAMAGED.	0	NO REPAIR (CABLE SATISFACTORY IN THIS CONDITION)
SHEATH:	-SURFACE NICKS IN POLYIMIDE: YOU CANNOT SEE THE SCREENING -DEEP NICKS IN POLYIMIDE: YOU CAN SEE THE SCREENING BUT IT IS NOT DAMAGED	1	2-A 2-B
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE (DELAMINATION) MIDDLE OF CABLE	4 1	REPLACE THE CABLE 2-A
	-SEPARATION OF AMBER COLORED POLTIMIDE TAPE (DELAMINATION) END OF CABLE	1	2-B
SCREENING:	-DAMAGED STRANDS: YOU CAN SEE THE COPPER (NICKEL DAMAGED) -BROKEN STRANDS: (MAX 10% OF STRANDS CUT)	1	2-A 2-B
	-BROKEN STRANDS: (MORE THAN 10% OF STRANDS CUT) NOTE: EXCEPT IN LANDING GEAR AREA, FUEL AREAS, THS AREA, FIN AREA	1 1*	2-C 2-E
	-BROKEN STRANDS: (MORE THAN 10% OF STRANDS CUT) NOTE: ALL AREAS	1 3	2-D 2-F

* GRADE 3 FOR SENSITIVE AND EFCS CABLES.

REPAIR CLASSIFICATION:

GRADE 0:NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1:PERMANENT REPAIR
GRADE 2:A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK (REFER CHAPTER 20-52-10).
GRADE 3:TEMPORARY REPAIR ONLY, REPLACE WITH NEW WIRE IN ACCORDANCE WITH THE BASIC DEFINITION AT SUBSEQUENT C-CHECK.
GRADE 4:NO REPAIR IS PERMITTED (CHANGE THE WIRE).

Layout and Table for Damage Assessment
MG, SJ, TK, UD and WF
Figure 003

S15 20 53 22 0 ADMO 01

EFF : ALL

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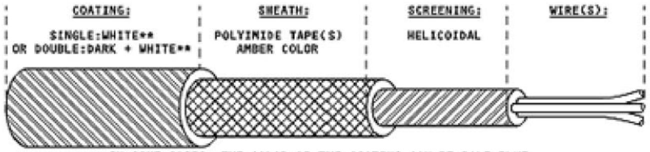
ELECTRICAL STANDARD PRACTICES MANUAL

TYPE: SJ, SJ-C, SJ-U, TK, TK-C, TK-U, UD, UD-C, UD-U, MG, WF



** IN SOME CASES, THE COLOR OF THE COATING CAN BE PALE BLUE.

DAMAGE LOCATION	DAMAGE ASSESSMENT	GRADE	REPAIR TYPE (ORDER OF PRIORITY)
COATING:	-SURFACE SCRATCHES IN OUTER COATING: YOU CAN SEE POLYIMIDE BUT IT IS NOT DAMAGED -CASE OF CO2 LASER CABLE: YOU CAN SEE THE DARK COATING YOU CAN SEE POLYIMIDE THROUGH THE TRANSPARENT BUT FOR (EXCEPT WF TYPE) THE COATING IS NOT DAMAGED.	0	NO REPAIR (CABLE SATISFACTORY IN THIS CONDITION)
SHEATH:	-SURFACE NICKS IN POLYIMIDE: YOU CANNOT SEE THE SCREENING -DEEP NICKS IN POLYIMIDE: YOU CAN SEE THE SCREENING BUT IT IS NOT DAMAGED	1	2-A 2-B
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE (DELAMINATION) MIDDLE OF CABLE	4 1	REPLACE THE CABLE 2-A
	-SEPARATION OF AMBER COLORED POLTYIMIDE TAPE (DELAMINATION) END OF CABLE	1	2-B
SCREENING:	-DAMAGED STRANDS: YOU CAN SEE THE COPPER (NICKEL DAMAGED) -BROKEN STRANDS: (MAX 10% OF STRANDS CUT)	1	2-A 2-B
	-BROKEN STRANDS: (MORE THAN 10% OF STRANDS CUT) NOTE: EXCEPT IN LANDING GEAR AREA, FUEL AREAS, THS AREA, FIN AREA	1 1*	2-C 2-E
	-BROKEN STRANDS: (MORE THAN 10% OF STRANDS CUT) NOTE: ALL AREAS	1 3	2-D 2-F

* GRADE 3 FOR SENSITIVE AND EFCS CABLES.

REPAIR CLASSIFICATION:

GRADE 0:NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1:PERMANENT REPAIR
GRADE 2:A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK (REFER CHAPTER 20-52-10).
GRADE 3:TEMPORARY REPAIR ONLY, REPLACE WITH NEW WIRE IN ACCORDANCE WITH THE BASIC DEFINITION AT SUBSEQUENT C-CHECK.
GRADE 4:NO REPAIR IS PERMITTED (CHANGE THE WIRE).

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Layout and Table for Damage Assessment
MG, SJ, TK, UD and WF
Figure 003

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WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

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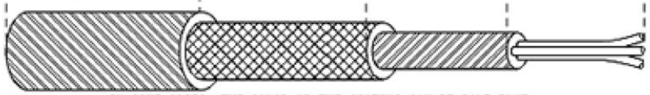
ELECTRICAL STANDARD PRACTICES MANUAL

TYPE: SJ, SJ-C, SJ-U, TK, TK-C, TK-U, UD, UD-C, UD-U, MG, WF

COATING:	SHEATH:	SCREENING:	WIRE(S):
SINGLE:WHITE** OR DOUBLE:DARK + WHITE**	POLYIMIDE TAPE(S) AMBER COLOR	HELICOIDAL	



** IN SOME CASES, THE COLOR OF THE COATING CAN BE PALE BLUE.

DAMAGE LOCATION	DAMAGE ASSESSMENT	GRADE	REPAIR TYPE (ORDER OF PRIORITY)
COATING:	-SURFACE SCRATCHES IN OUTER COATING: YOU CAN SEE POLYIMIDE BUT IT IS NOT DAMAGED -CASE OF CO2 LASER CABLE: YOU CAN SEE THE DARK COATING YOU CAN SEE POLYIMIDE THROUGH THE TRANSPARENT BUT FOR (EXCEPT WF TYPE) THE COATING IS NOT DAMAGED.	0	NO REPAIR (CABLE SATISFACTORY IN THIS CONDITION)
SHEATH:	-SURFACE NICKS IN POLYIMIDE: YOU CANNOT SEE THE SCREENING -DEEP NICKS IN POLYIMIDE: YOU CAN SEE THE SCREENING BUT IT IS NOT DAMAGED	1	2-A 2-B
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE (DELAMINATION) MIDDLE OF CABLE	4 1	REPLACE THE CABLE 2-A
	-SEPARATION OF AMBER COLORED POLTIMIDE TAPE (DELAMINATION) END OF CABLE	1	2-B
SCREENING:	-DAMAGED STRANDS: YOU CAN SEE THE COPPER (NICKEL DAMAGED) -BROKEN STRANDS: (MAX 10% OF STRANDS CUT)	1	2-A 2-B
	-BROKEN STRANDS: (MORE THAN 10% OF STRANDS CUT) NOTE: EXCEPT IN LANDING GEAR AREA, FUEL AREAS, THS AREA, FIN AREA	1 1*	2-C 2-E
	-BROKEN STRANDS: (MORE THAN 10% OF STRANDS CUT) NOTE: ALL AREAS	1 3	2-D 2-F

* GRADE 3 FOR SENSITIVE AND EFCS CABLES.

REPAIR CLASSIFICATION:

GRADE 0:NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1:PERMANENT REPAIR
GRADE 2:A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK (REFER CHAPTER 20-52-10).
GRADE 3:TEMPORARY REPAIR ONLY, REPLACE WITH NEW WIRE IN ACCORDANCE WITH THE BASIC DEFINITION AT SUBSEQUENT C-CHECK.
GRADE 4:NO REPAIR IS PERMITTED (CHANGE THE WIRE).

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Layout and Table for Damage Assessment
MG, SJ, TK, UD and WF
Figure 003

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3. Repair Procedure

A. Procedure

R

This paragraph gives the general description and conditions of application for each repair type.

R (1) Method 2A - Wrapping with PTFE tape Material No 05-116
R Ref. 20-53-29 for detailled procedure
R (Ref. Fig. 007)

R (2) Method 2B - Heat-Shrink Sleeve Insulating
R (Ref. Fig. 007)

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GENERAL REPAIR PROCEDURE - DESCRIPTION AND OPERATION

1. General
   This chapter gives detailed description and additional information for electrical cable repair.

2. General Repair Procedure

R A. Wrapping

(1) Wrapping with PTFE tape Material No 05-116 (Ref. Fig. 001)
   This repair procedure is related to these repair types:
   - 1A, 2A, 3A, 4A, 5A and 6A.
   - 3C and 3E.

(2) Wrapping with glasscloth (Ref. Fig. 002)
   This repair procedure is related to these repair types:
   - 3D and 3F.
   - 3C and 3E.

B. Heat-Shrink Sleeve Insulating

(1) Procedure
   - Find the sleeve P/N in relation to the gauge and type of the cable.
   - The length of the sleeve must be sufficient to cover the damage and a minimum overlap of 10 mm (0.3937 in.) on each side of the damage.
   - Shrink the sleeve at the permitted temperature.

(2) This repair procedure is related to these repair types:
   - 1B, 2B, 3B, 4B and 5B.
   - 1D, 4D and 5D.
   - 3F.
   - 2C, 2D, 2E and 2F.

EFF : ALL

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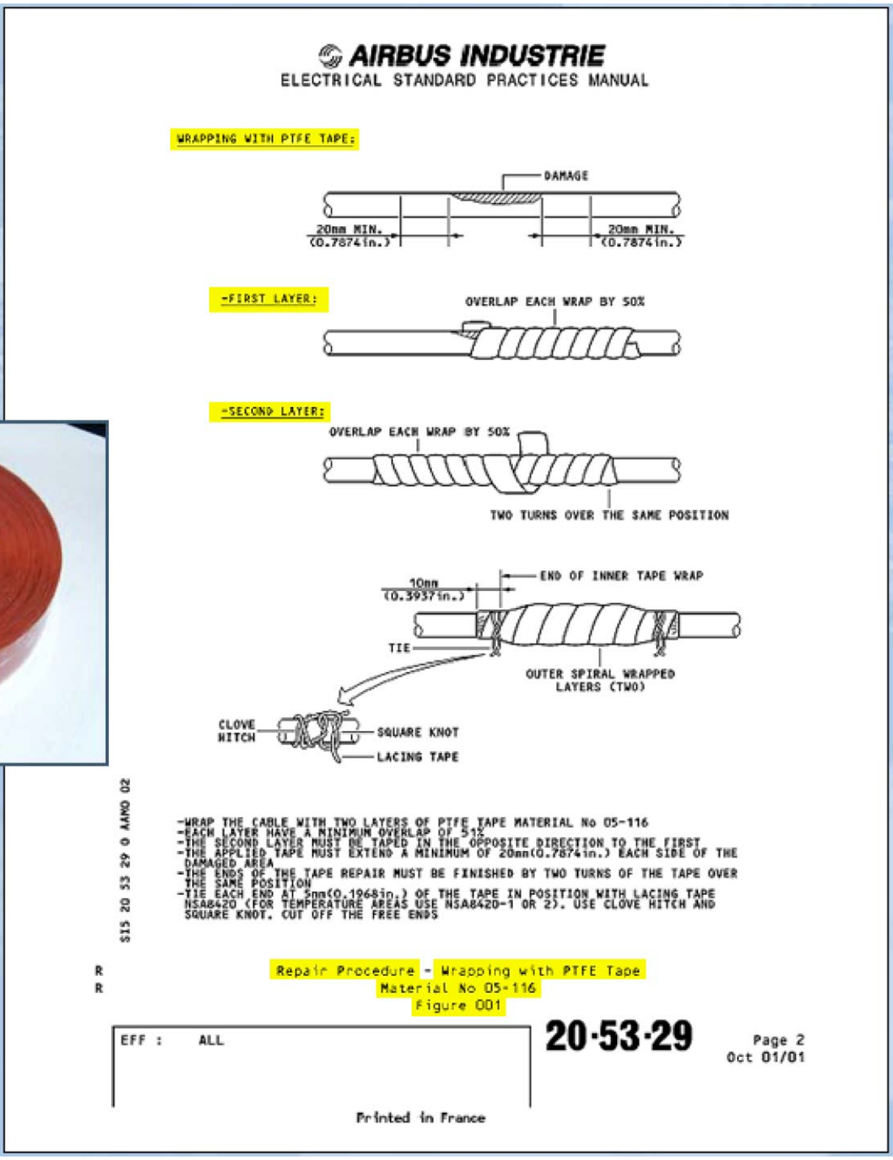

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ELECTRICAL STANDARD PRACTICES MANUAL

WRAPPING WITH PTFE TAPE:

-FIRST LAYER:

-SECOND LAYER:

S15 20 53 29 0 AAMO 02

-WRAP THE CABLE WITH TWO LAYERS OF PTFE TAPE MATERIAL No 05-116
-EACH LAYER HAVE A MINIMUM OVERLAP OF 51%
-THE SECOND LAYER MUST BE TAPED IN THE OPPOSITE DIRECTION TO THE FIRST
-THE APPLIED TAPE MUST EXTEND A MINIMUM OF 20mm(0.7874in.) EACH SIDE OF THE DAMAGED AREA
-THE ENDS OF THE TAPE REPAIR MUST BE FINISHED BY TWO TURNS OF THE TAPE OVER THE SAME POSITION
-TIE EACH END AT 5mm(0.1968in.) OF THE TAPE IN POSITION WITH LACING TAPE NSA8420 (FOR TEMPERATURE AREAS USE NSA8420-1 OR 2). USE CLOVE HITCH AND SQUARE KNOT. CUT OFF THE FREE ENDS

R Repair Procedure - Wrapping with PTFE Tape
R Material No 05-116
Figure 001

EFF : ALL

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WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

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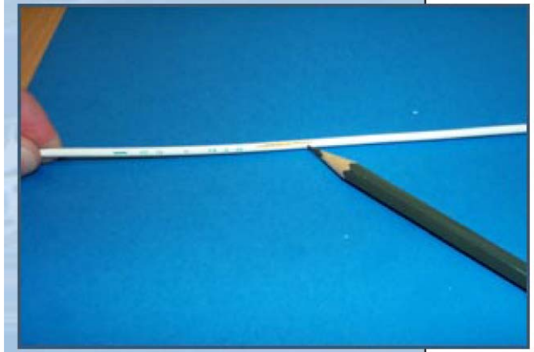

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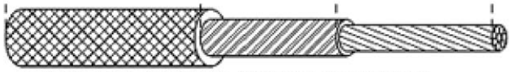
ELECTRICAL STANDARD PRACTICES MANUAL

TYPE: AKA, AKB, CF, CF-C, CF-U, PD, PF, QD, QF, RD, RF, AK(150°C/302°F)

COATING:	INSULATION:	CONDUCTOR:
SINGLE:WHITE ** OR DOUBLE:DARK + WHITE **	POLYIMIDE TAPES AMBER COLOR	Cu Ni OR Cu Ni ALLOY ACCORDING TO GAUGE METAL COLOR



**IN SOME CASES, THE COATING CAN HAVE A DIFFERENT COLOR

DAMAGE LOCATION	DAMAGE ASSESSMENT	GRADE	REPAIR TYPE (ORDER OF PRIORITY)
COATING:	-SURFACE SCRATCHES - OUTER COATING: YOU CAN SEE POLYIMIDE INSULATION BUT IT IS NOT DAMAGED -CASE OF CO2 LASER CABLE (CF-C ONLY): YOU CAN SEE THE DARK COATING YOU CAN SEE POLYIMIDE INSULATION THROUGH THE TRANSPARENT COATING BUT THE COATING IS NOT DAMAGED	0	NO REPAIR (CABLE SATISFACTORY IN THIS CONDITION)
INSULATION:	-SURFACE NICKS IN POLYIMIDE: YOU CANNOT SEE THE CORE	1	1-B
	-DEEP NICKS IN POLYIMIDE: YOU CAN SEE THE CORE BUT IT IS NOT DAMAGED	1*	1-C 1-D 1-E
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE MIDDLE OF CABLE	1*	1-C 1-D 1-E
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE END OF CABLE	1	1-B
CORE:	-DAMAGED STRANDS OR CUT CORE: YOU CAN SEE THE COPPER (NICKEL DAMAGED) OR THE STRANDS ARE CUT	1*	1-C 1-E

* GRADE 3 FOR SENSITIVE AND EFCS CABLES

REPAIR CLASSIFICATION:

GRADE 0:NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1:PERMANENT REPAIR
GRADE 2:A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK (REFER CHAPTER 20-52-10).
GRADE 3:TEMPORARY REPAIR ONLY, REPLACE WITH NEW WIRE IN ACCORDANCE WITH THE BASIC DEFINITION AT SUBSEQUENT C-CHECK.
GRADE 4:NO REPAIR IS PERMITTED (REPLACE THE WIRE).

S15 20 53 21 0 ADMO 01

Layout and Table for Damage Assessment
AK, CF, PD, PF, QD, QF, RD, and RF
Figure 002

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WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

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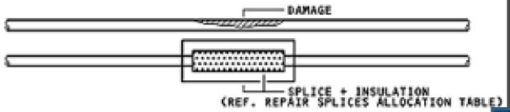
REPAIR TYPE		GENERAL DESCRIPTION	CONDITIONS OF APPLICATION
1	A	-WRAP WITH PTFE TAPE MATERIAL No 05-116	-DAMAGE ≤ 300mm(11.8110in.)
	B	-DISCONNECT THE CABLE TERMINATION -INSTALL THE APPLICABLE HEAT-SHRINK SLEEVE ON THE DAMAGE (REF. SLEEVES ALLOCATION TABLE)	-LENGTH MUST BE EASY TO REMOVE -DAMAGE ≤ 300mm(11.8110in.)
	C	-CUT THE WIRE AT THE DAMAGE -ENGAGE THE APPLICABLE HEAT-SHRINK SLEEVE OR STANDARD SLEEVE ON THE CABLE (REF. REPAIR SPLICES ALLOCATION TABLE) -INSTALL THE APPLICABLE SPLICE ON THE DAMAGE (REF. REPAIR SPLICES ALLOCATION TABLE) -INSTALL THE SLEEVE ON THE SPLICE	-LENGTH OF DAMAGE IS LESS THAN LENGTH OF THE SPLICE -IF THERE ARE MORE THAN 3 REPAIR SPLICES ON THE SAME WIRE, REPLACE THE CABLE



MAKE SURE YOU USE THE CORRECT SLEEVE FOR THE AIRCRAFT TEMPERATURE ZON

S15 20 53 21 0 AJMO 02

Repair of Standard Cables - Repair Procedure Table
AK, CF, DE, DK, PD, PE, PF, PG, QD, QE, QF, QG, RD, RE, RF and RH
Figure 004

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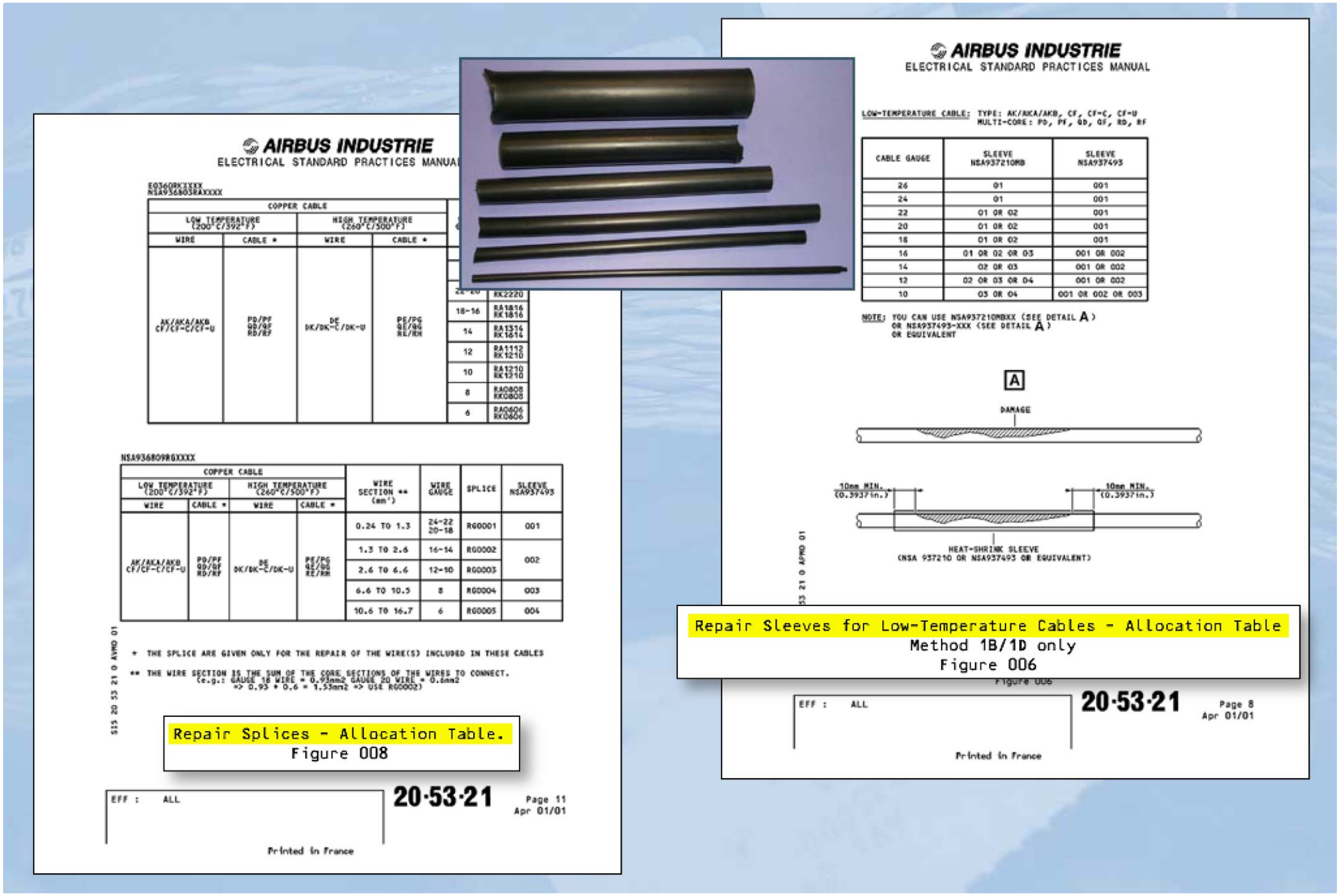
WIRE DAMAGE ASSESSMENT AND CLASSIFICATION



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E0360RKXXXX
NSA936803RAXXXX

COPPER CABLE					
LOW TEMPERATURE (200°C/392°F)		HIGH TEMPERATURE (260°C/500°F)			
WIRE	CABLE *	WIRE	CABLE *		
AK/AKA/AKB CF/CF-C/CF-U	PD/PF QD/QF RD/RF	DE DK/DK-C/DK-U	PE/PG QE/QG RE/RH		
				22-20	RK2220
				18-16	RA1816 RK1816
				14	RA1314 RK1614
				12	RA1112 RK1210
				10	RA1210 RK1210
				8	RA0808 RK0808
				6	RA0606 RK0606

NSA936809RGXXXX

COPPER CABLE				WIRE SECTION ** (mm²)	WIRE GAUGE	SPLICE	SLEEVE NSA937493
LOW TEMPERATURE (200°C/392°F)		HIGH TEMPERATURE (260°C/500°F)					
WIRE	CABLE *	WIRE	CABLE *				
AK/AKA/AKB CF/CF-C/CF-U	PD/PF QD/QF RD/RF	DE DK/DK-C/DK-U	PE/PG QE/QG RE/RH	0.24 TO 1.3	24-22 20-18	RG0001	001
				1.3 TO 2.6	16-14	RG0002	002
				2.6 TO 6.6	12-10	RG0003	
				6.6 TO 10.5	8	RG0004	003
				10.6 TO 16.7	6	RG0005	004

* THE SPLICE ARE GIVEN ONLY FOR THE REPAIR OF THE WIRE(S) INCLUDED IN THESE CABLES

** THE WIRE SECTION IS THE SUM OF THE CORE SECTIONS OF THE WIRES TO CONNECT. (e.g.: GAUGE 18 WIRE = 0.93mm2 GAUGE 20 WIRE = 0.6mm2 => 0.93 + 0.6 = 1.53mm2 => USE RG0002)

SIS 20 53 21 0 AVMO 01

Repair Splices - Allocation Table.
Figure 008

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ELECTRICAL STANDARD PRACTICES MANUAL

LOW-TEMPERATURE CABLE: TYPE: AK/AKA/AKB, CF, CF-C, CF-U
MULTI-CORE: PD, PF, QD, QF, RD, RF

CABLE GAUGE	SLEEVE NSA937210MB	SLEEVE NSA937493
26	01	001
24	01	001
22	01 OR 02	001
20	01 OR 02	001
18	01 OR 02	001
16	01 OR 02 OR 03	001 OR 002
14	02 OR 03	001 OR 002
12	02 OR 03 OR 04	001 OR 002
10	03 OR 04	001 OR 002 OR 003

NOTE: YOU CAN USE NSA937210MBXX (SEE DETAIL A) OR NSA937493-XXX (SEE DETAIL A) OR EQUIVALENT

A

DAMAGE

10mm MIN. (0.3937in.)
10mm MIN. (0.3937in.)
HEAT-SHRINK SLEEVE (NSA 937210 OR NSA937493 OR EQUIVALENT)

SIS 20 53 21 0 APMO 01

Repair Sleeves for Low-Temperature Cables - Allocation Table
Method 1B/1D only
Figure 006

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WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

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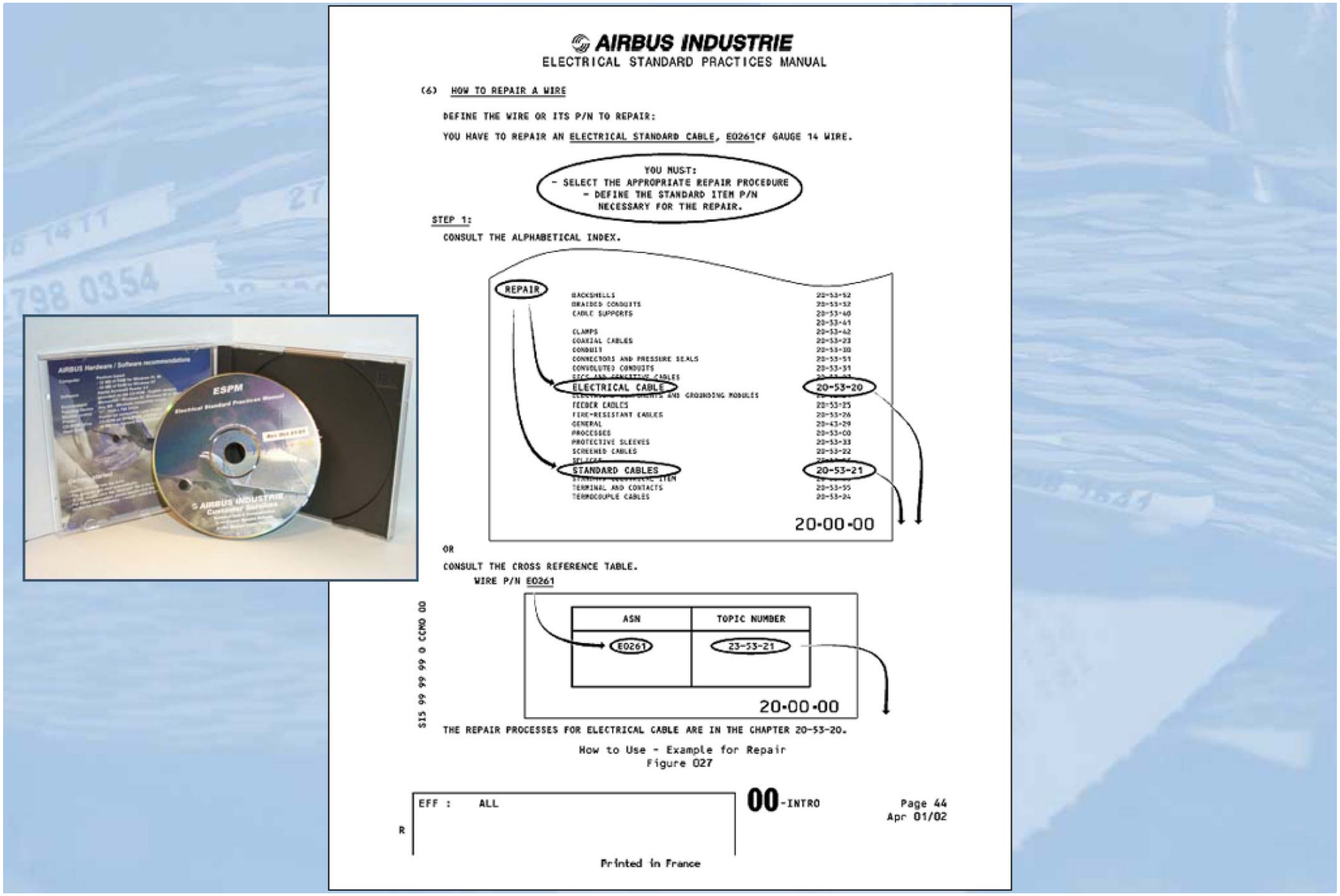
WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

WIRE DAMAGE ASSESSMENT AND CLASSIFICATION



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ELECTRICAL STANDARD PRACTICES MANUAL

(6) HOW TO REPAIR A WIRE

DEFINE THE WIRE OR ITS P/N TO REPAIR:

YOU HAVE TO REPAIR AN ELECTRICAL STANDARD CABLE, E0261CF GAUGE 14 WIRE.

YOU MUST:
- SELECT THE APPROPRIATE REPAIR PROCEDURE
- DEFINE THE STANDARD ITEM P/N NECESSARY FOR THE REPAIR.

STEP 1:

CONSULT THE ALPHABETICAL INDEX.

REPAIR

BACKSHELLS	20-53-52
BRAIDED CONDUITS	20-55-52
CABLE SUPPORTS	20-53-40
	20-53-41
CLAMPS	20-53-42
COAXIAL CABLES	20-53-23
CONDUIT	20-53-30
CONNECTORS AND PRESSURE SEALS	20-53-51
CONVOLUTED CONDUITS	20-53-31
ELECTRICAL CABLE	20-53-20
FEEDER CABLES	20-53-25
FIRE-RESISTANT CABLES	20-53-26
GENERAL	20-43-29
PROCESSES	20-53-00
PROTECTIVE SLEEVES	20-53-33
SCREENED CABLES	20-53-22
STANDARD CABLES	20-53-21
TERMINAL AND CONTACTS	20-53-55
TERMOCOUPLE CABLES	20-53-24

20-00-00

OR

CONSULT THE CROSS REFERENCE TABLE.
WIRE P/N E0261

ASN	TOPIC NUMBER
E0261	23-53-21

20-00-00

S15 99 99 99 0 CCMO 00

THE REPAIR PROCESSES FOR ELECTRICAL CABLE ARE IN THE CHAPTER 20-53-20.

How to Use - Example for Repair
Figure 027

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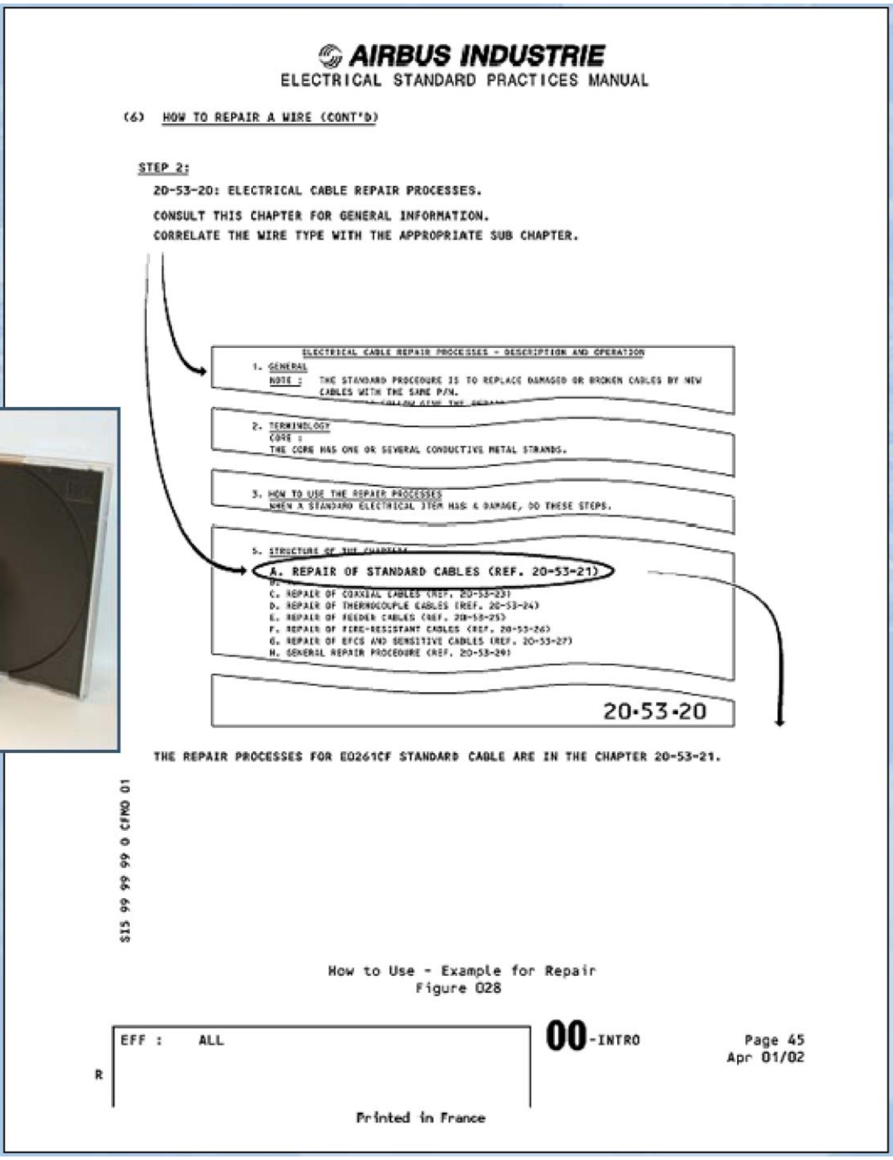
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(6) HOW TO REPAIR A WIRE (CONT'D)

STEP 2:

20-53-20: ELECTRICAL CABLE REPAIR PROCESSES.

CONSULT THIS CHAPTER FOR GENERAL INFORMATION.
CORRELATE THE WIRE TYPE WITH THE APPROPRIATE SUB CHAPTER.

ELECTRICAL CABLE REPAIR PROCESSES - DESCRIPTION AND OPERATION

1. GENERAL
NOTE : THE STANDARD PROCEDURE IS TO REPLACE DAMAGED OR BROKEN CABLES BY NEW CABLES WITH THE SAME P/N.

2. TERMINOLOGY
CORE :
THE CORE HAS ONE OR SEVERAL CONDUCTIVE METAL STRANDS.

3. HOW TO USE THE REPAIR PROCESSES
WHEN A STANDARD ELECTRICAL ITEM HAS A DAMAGE, DO THESE STEPS.

5. STRUCTURE OF THE CHAPTER
A. REPAIR OF STANDARD CABLES (REF. 20-53-21)
C. REPAIR OF COAXIAL CABLES (REF. 20-53-23)
D. REPAIR OF THERMOCOUPLE CABLES (REF. 20-53-24)
E. REPAIR OF FEEDER CABLES (REF. 20-53-25)
F. REPAIR OF FIRE-RESISTANT CABLES (REF. 20-53-26)
G. REPAIR OF EFCS AND SENSITIVE CABLES (REF. 20-53-27)
H. GENERAL REPAIR PROCEDURE (REF. 20-53-29)

20-53-20

THE REPAIR PROCESSES FOR E0261CF STANDARD CABLE ARE IN THE CHAPTER 20-53-21.

S15 99 99 99 0 CFM0 01

How to Use - Example for Repair
Figure 028

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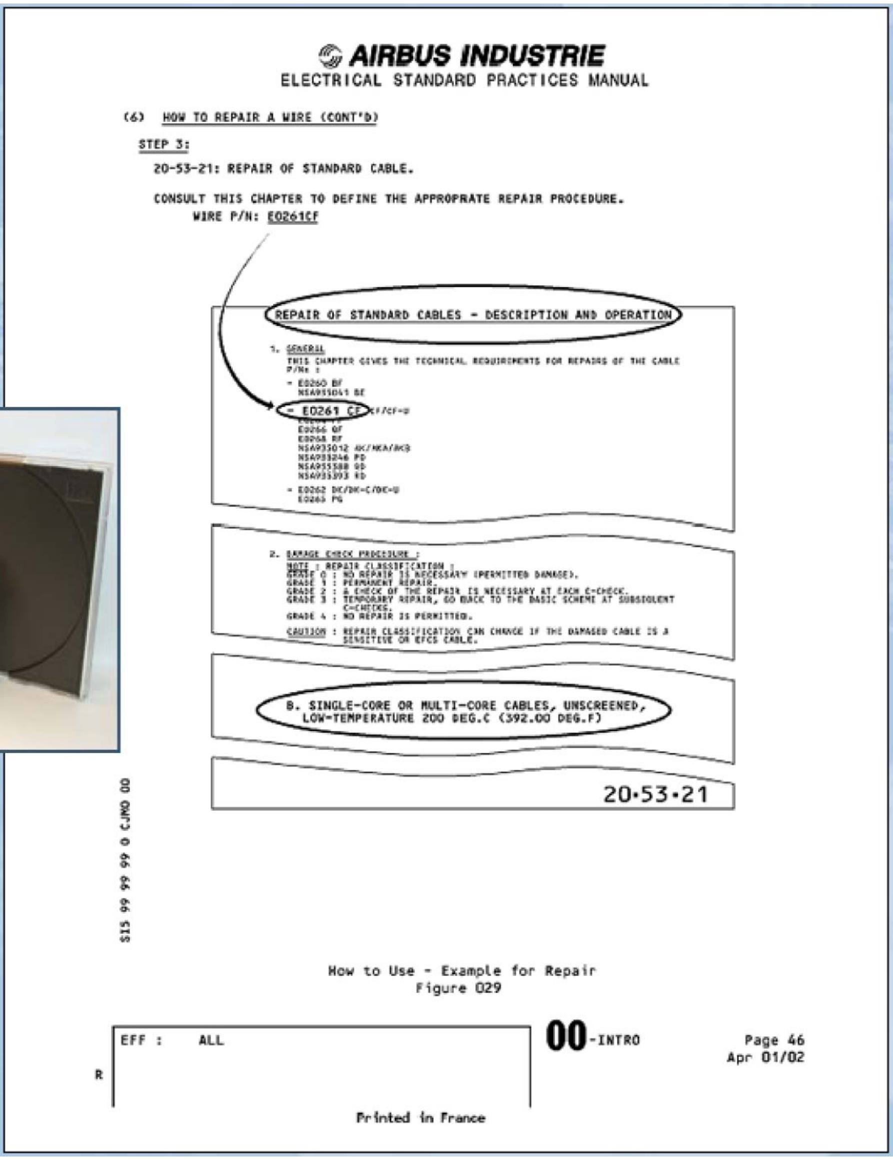
WIRE DAMAGE ASSESSMENT AND CLASSIFICATION



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ELECTRICAL STANDARD PRACTICES MANUAL

(6) HOW TO REPAIR A WIRE (CONT'D)

STEP 3:

20-53-21: REPAIR OF STANDARD CABLE.

CONSULT THIS CHAPTER TO DEFINE THE APPROPRATE REPAIR PROCEDURE.
WIRE P/N: E0261CF

REPAIR OF STANDARD CABLES - DESCRIPTION AND OPERATION

1. GENERAL
THIS CHAPTER GIVES THE TECHNICAL REQUIREMENTS FOR REPAIRS OF THE CABLE P/Ns :
- E0260 BF
NSA935041 BE
- E0261 CF CF/CF-U
E0266 QF
E0268 RF
NSA935012 AK/AKA/AKB
NSA933246 PD
NSA935388 SD
NSA935393 RD
- E0262 DK/DK-C/DK-U
E0263 PG

2. DAMAGE CHECK PROCEDURE :
NOTE : REPAIR CLASSIFICATION :
GRADE 0 : NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1 : PERMANENT REPAIR.
GRADE 2 : A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK.
GRADE 3 : TEMPORARY REPAIR, GO BACK TO THE BASIC SCHEME AT SUBSEQUENT C-CHECKS.
GRADE 4 : NO REPAIR IS PERMITTED.
CAUTION : REPAIR CLASSIFICATION CAN CHANGE IF THE DAMAGED CABLE IS A SENSITIVE OR EFCS CABLE.

B. SINGLE-CORE OR MULTI-CORE CABLES, UNSCREENED, LOW-TEMPERATURE 200 DEG.C (392.00 DEG.F)

20-53-21

S15 99 99 99 0 CJN0 00

How to Use - Example for Repair
Figure 029

EFF : ALL

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00-INTRO

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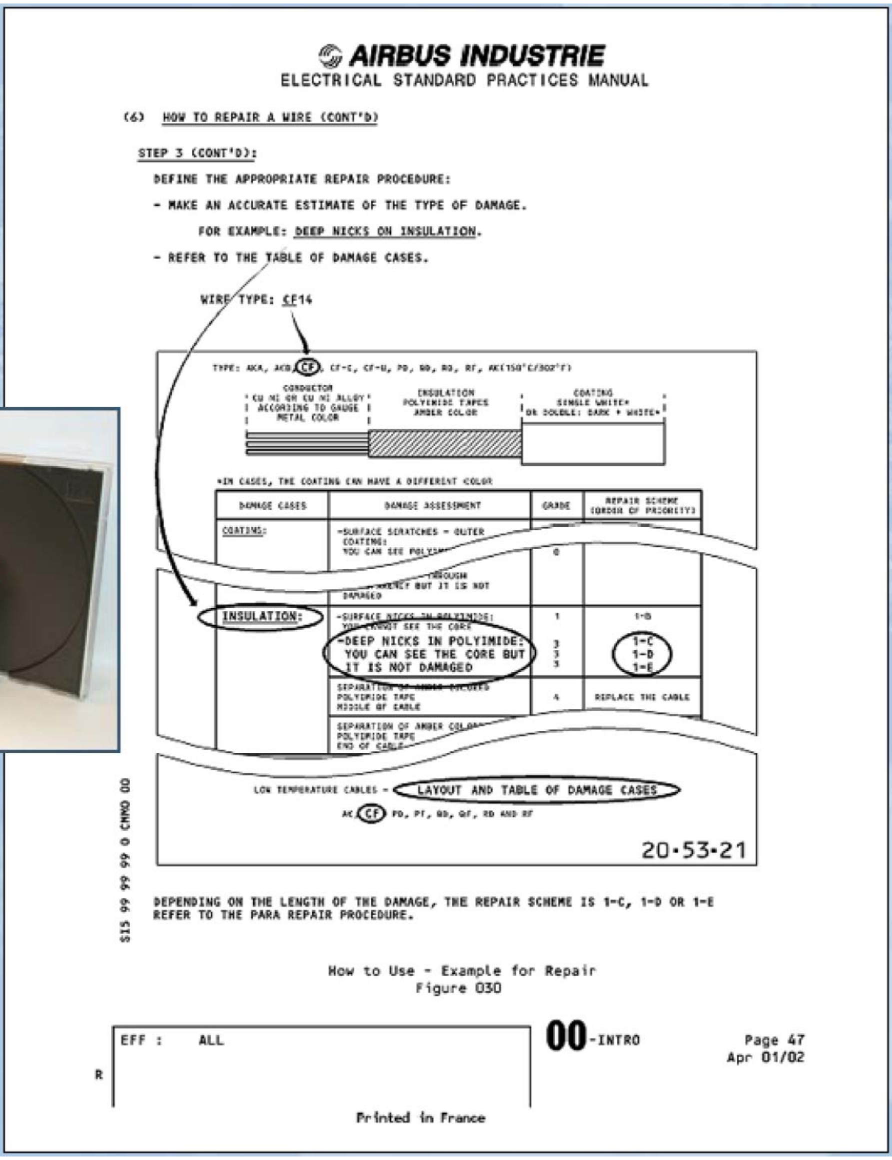
WIRE DAMAGE ASSESSMENT AND CLASSIFICATION



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

(6) HOW TO REPAIR A WIRE (CONT'D)

STEP 3 (CONT'D):

DEFINE THE APPROPRIATE REPAIR PROCEDURE:

- MAKE AN ACCURATE ESTIMATE OF THE TYPE OF DAMAGE.
  FOR EXAMPLE: DEEP NICKS ON INSULATION.
- REFER TO THE TABLE OF DAMAGE CASES.

WIRE TYPE: CF14

TYPE: AKA, AKB, CF, CF-C, CF-U, PD, RD, RG, RF, AK(150°C/302°F)

CONDUCTOR CU NI OR CU NI ALLOY ACCORDING TO GAUGE METAL COLOR

INSULATION POLYIMIDE TAPES AMBER COLOR

COATING SINGLE WHITE* OR DOUBLE: DARK + WHITE*

*IN CASES, THE COATING CAN HAVE A DIFFERENT COLOR

DAMAGE CASES	DAMAGE ASSESSMENT	GRADE	REPAIR SCHEME (ORDER OF PRIORITY)
COATING:	-SURFACE SCRATCHES - OUTER COATING: YOU CAN SEE POLYIM...	0	
	... THROUGH ...ARENCY BUT IT IS NOT DAMAGED		
INSULATION:	-SURFACE NICKS IN POLYIMIDE: YOU CANNOT SEE THE CORE	1	1-B
	-DEEP NICKS IN POLYIMIDE: YOU CAN SEE THE CORE BUT IT IS NOT DAMAGED	3 3 3	1-C 1-D 1-E
	SEPARATION OF AMBER COLORED POLYIMIDE TAPE MIDDLE OF CABLE	4	REPLACE THE CABLE
	SEPARATION OF AMBER COLO... POLYIMIDE TAPE END OF CABLE		

LOW TEMPERATURE CABLES - LAYOUT AND TABLE OF DAMAGE CASES
AK, CF, PD, PT, RD, QF, RD AND RF

20-53-21

S15 99 99 99 0 CMM0 00

DEPENDING ON THE LENGTH OF THE DAMAGE, THE REPAIR SCHEME IS 1-C, 1-D OR 1-E
REFER TO THE PARA REPAIR PROCEDURE.

How to Use - Example for Repair
Figure 030

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WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

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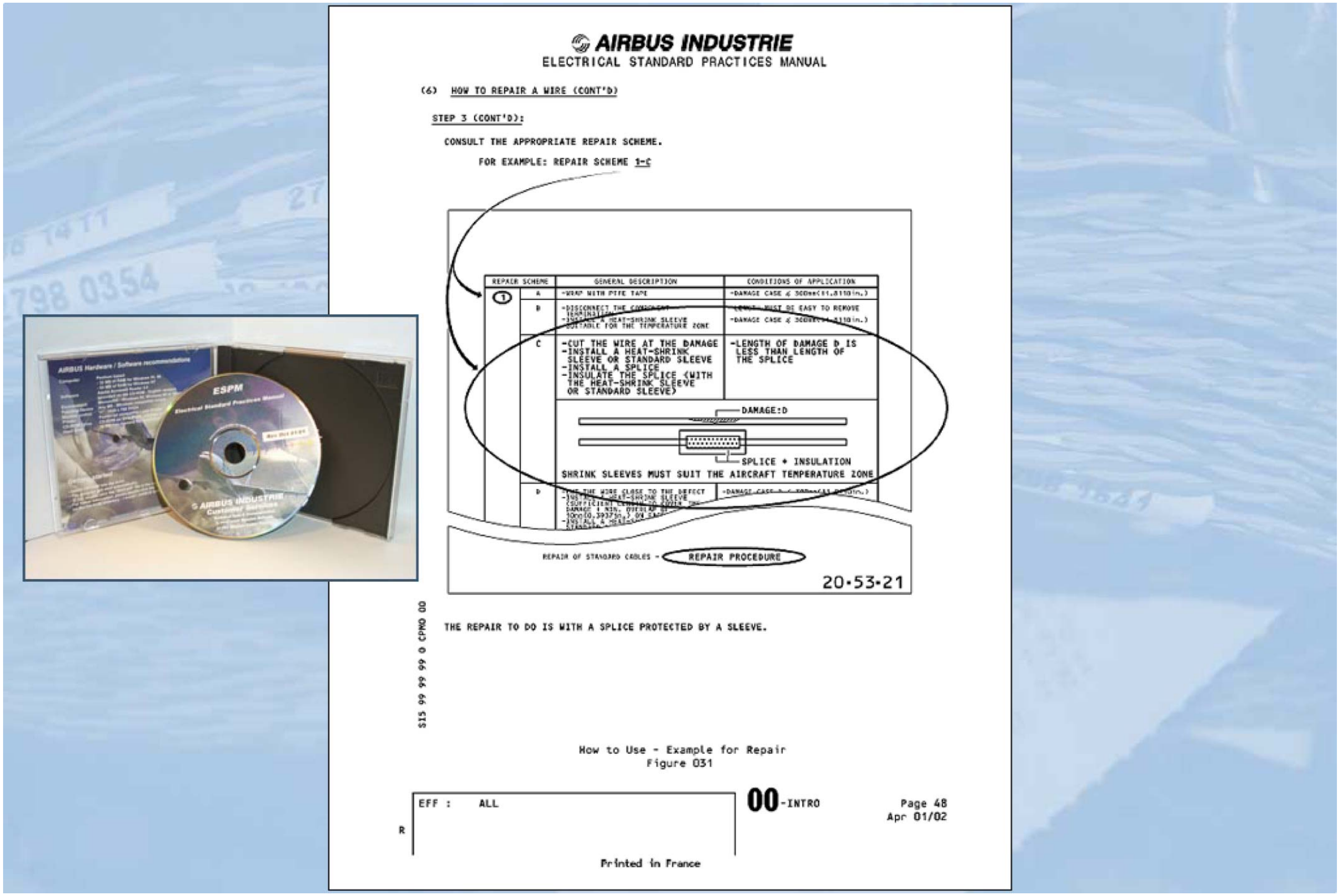

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ELECTRICAL STANDARD PRACTICES MANUAL

(6) HOW TO REPAIR A WIRE (CONT'D)

STEP 3 (CONT'D):

CONSULT THE APPROPRIATE REPAIR SCHEME.

FOR EXAMPLE: REPAIR SCHEME 1-C

REPAIR SCHEME		GENERAL DESCRIPTION	CONDITIONS OF APPLICATION
1	A	-WRAP WITH PTFE TAPE	-DAMAGE CASE ≤ 300mm(11.8110in.)
	B	-DISCONNECT THE COMPONENT TERMINATION -INSTALL A HEAT-SHRINK SLEEVE SUITABLE FOR THE TEMPERATURE ZONE	-MUST BE EASY TO REMOVE -DAMAGE CASE ≤ 300mm(11.8110in.)
	C	-CUT THE WIRE AT THE DAMAGE -INSTALL A HEAT-SHRINK SLEEVE OR STANDARD SLEEVE -INSTALL A SPLICE -INSULATE THE SPLICE (WITH THE HEAT-SHRINK SLEEVE OR STANDARD SLEEVE)	-LENGTH OF DAMAGE D IS LESS THAN LENGTH OF THE SPLICE
		DAMAGE:D SPLICE + INSULATION SHRINK SLEEVES MUST SUIT THE AIRCRAFT TEMPERATURE ZONE	
	D	[illegible]	[illegible]

REPAIR OF STANDARD CABLES - REPAIR PROCEDURE

20-53-21

THE REPAIR TO DO IS WITH A SPLICE PROTECTED BY A SLEEVE.

S15 99 99 99 0 CPM0 00

How to Use - Example for Repair
Figure 031

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WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

(6) HOW TO REPAIR A WIRE (CONT'D)

STEP 4:

DEFINE THE SLEEVE FULL P/N:
- CONSULT THE REPAIR SLEEVES ALLOCATION TABLE.
- CORRELATE THE WIRE TYPE WITH THE WIRE GAUGE IN THE TABLE.

WIRE TYPE AND GAUGE: CF14

LOW TEMPERATURE CABLE: TYPE AK/AKA/AKB, CF, CF-E, CF-U
MULTI-CORE: PD, PF, QD, QF, RD, RF

CABLE GAUGE	SLEEVE NSA937210MB	SLEEVE NSA937493
26	01	001
24	01	001
22	01 OR 02	001
20	01 OR 02	001
18	01 OR 02	001
16	01 OR 02 OR 03	001 OR 002
14	02 OR 03	001 OR 002
12	02 OR 03 OR 04	001 OR 002
10	03 OR 04	001 OR 002 OR 003

NOTE: YOU CAN USE NSA937210MB OR NSA937493 OR EQUIVALENT

HIGH-TEMPERATURE CABLE: TYPE DE, DK, DK-C, DK-U
MULTI-CORE PE, PG, ...

REPAIR SLEEVES - ALLOCATION TABLE

20-53-21

THE SLEEVE P/N TO PROTECT A CF14 WIRE IS:

NSA937210MB02XX OR MB03XX
OR
NSA937493-001 OR -002

NOTE: THE LENGTH OF THE SLEEVE DEPENDS ON THE LENGTH OF THE DAMAGE.

How to Use - Example for Repair
Figure 032

S15 99 99 99 0 CRMO 00

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WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

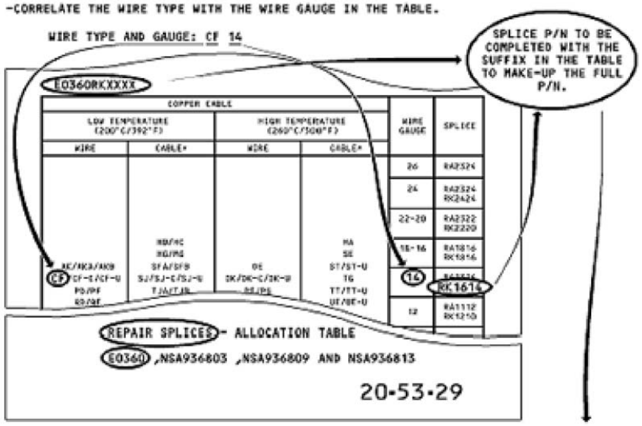
AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

(6) HOW TO REPAIR A WIRE (CONT'D)

STEP 5:

DEFINE THE SPLICE P/N:
-CONSULT THE ALLOCATION TABLE FOR REPAIR PURPOSES.
-CORRELATE THE WIRE TYPE WITH THE WIRE GAUGE IN THE TABLE.

WIRE TYPE AND GAUGE: CF 14



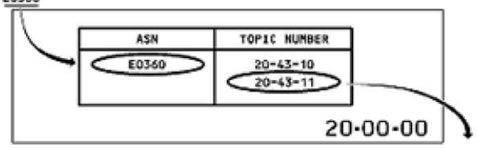
FOR CF14 WIRE, THE SPLICE P/N TO BE USED IS: E0360RK1614.

NOTE: IN FEW CASES, MORE THAN ONE REFERENCE MAY BE APPLICABLE, THEREFORE THE SELECTION OF THE SPLICE WILL BE MADE ACCORDING TO THE LOCATION, THE TEMPERATURE RANGE, AS REQUIRED.

STEP 6:

WHERE TO FIND INFORMATION ABOUT THE SPLICE?
CONSULT THE CROSS REFERENCE TABLES.

SPLICE E0360



THE CHAPTER 20-43-11 GIVES THE TOOLS AND THE PROCEDURE TO CONNECT THIS SPLICE.

How to Use - Example for Repair
Figure 033

S15 99 99 99 0 CUMO 00

EFF : ALL

00-INTRO

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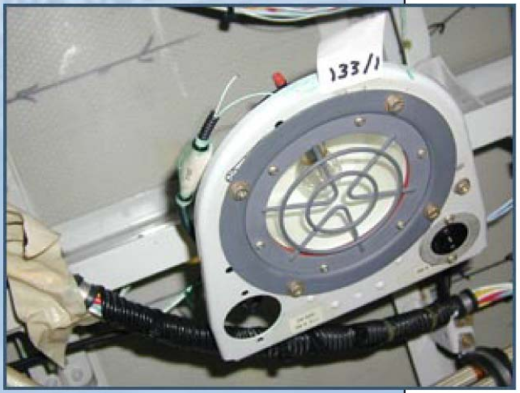
WIRE DAMAGE ASSESSMENT AND CLASSIFICATION

MAINTENANCE AND REPAIR PROCEDURES

TERMINALS AND SPLICES

Key word 'repair' also used for miscellaneous items.
Example: Terminal and splices.
Terminal layout.
Table of damage cases for pre-insulated terminals.
Table of damage cases for post-insulated terminals.
Splice repair: same principle.



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

REPAIR OF TERMINALS AND CONTACTS - DESCRIPTION AND OPERATION

1. General
This chapter gives the technical requirements of repairs for the terminals and for the contacts.

2. Damage Check Procedure

A. Pre-Insulated Copper Terminals

(1) Layout
(Ref. Fig. 001)

(2) Table of damage cases
(Ref. Fig. 002)

B. Post-Insulated Terminals

(1) Layout
(Ref. Fig. 001)

(2) Table of damage cases
(Ref. Fig. 003)
For copper,copalum and aluminum cables.

EFF : ALL

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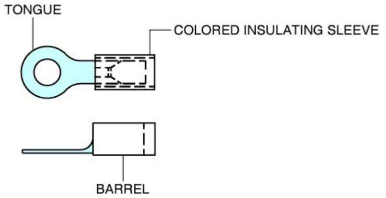
TERMINALS AND SPLICES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-53-55 - Repair of Terminals - Layout

PRE-INSULATED TERMINAL:
EXAMPLE: NSA936501TA



POST-INSULATED TERMINAL:
EXAMPLE: NSA936507TG

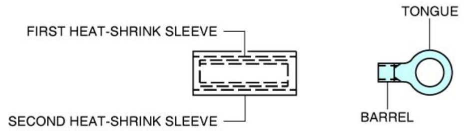


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Figure 001 (Sheet 1) / 20-53-55 - Repair of Terminals - Layout

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TERMINALS AND SPLICES

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Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-53-55 - Repair of Pre-Insulated Copper Terminal - Table of Damage Cases

DAMAGE LOCATION	DAMAGE ASSESSMENT	REPAIR SCHEME
CRIMPED SLEEVE:	DAMAGED OR LOST	- INSTALL HEAT-SHRINK ON THE TERMINAL. THE SLEEVE P/N DEPENDS ON THE ZONE (SEE AIRCRAFT ZONING CHAPTER). . -55 deg.C TO 175 deg.C (-67 deg.F TO 347 deg.F (HIGH TEMPERATURE HEAT-SHRINK) E0484 "SILICONE" + NSA937494 OR E0718 "KYNAR" . -55 deg.C TO 160 deg.C (-67 deg.F TO 320 deg.F) ABS0061 "DR25TW" X2 OR ABS0916 "DR25" . -55 deg.C TO 135 deg.C (-67 deg.F TO 275 deg.F) (LOW TEMPERATURE HEAT-SHRINK) E0216 OR NSA937211
		- IF YOU CANNOT INSTALL THE SLEEVE IN RELATION TO TONGUE OF TERMINAL INSTALL ABS0836
		- REPLACE THE TERMINAL
TONGUE:	CRACK AND COPPER VISIBLE	REPLACE THE TERMINAL
BARREL:	CRACK AND COPPER VISIBLE	REPLACE THE TERMINAL
CABLE BROKEN AT BACK OF BARREL:	TERMINAL NSA936501TA2004	REPLACE THE TERMINAL AND ADD HEAT-SHRINK SLEEVE (25mm/0.9842in.) PREVENTIVE SCHEME: ABS0836B02 REPAIR SCHEME: E0126-02B OR ABS0061B02 OR ABS0836B02
	TERMINAL NSA936501TA1604	REPLACE THE TERMINAL AND ADD HEAT-SHRINK SLEEVE (25mm/0.9842in.) PREVENTIVE OR REPAIR SCHEME: E0126-03B OR ABS0061B03 OR ABS0836B02

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Figure 002 (Sheet 1) / 20-53-55 - Repair of Pre-Insulated Copper Terminal - Table of Damage Cases

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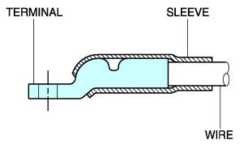
TERMINALS AND SPLICES

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-53-55 - Repair of Post-Insulated Terminals - Table of Damage Cases



DAMAGE LOCATION	DAMAGE ASSESSMENT	REPAIR SCHEME
SLEEVE:	- DAMAGED: WEAR, TEAR, SPLIT...	REPLACE THE SLEEVE (S)
TONGUE:	- CRACK AND COPPER VISIBLE	REPLACE THE TERMINAL
BARREL:	- CRACK AND COPPER VISIBLE	REPLACE THE TERMINAL

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Figure 003 (Sheet 1) / 20-53-55 - Repair of Post-Insulated Terminals - Table of Damage Cases

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TERMINALS AND SPLICES

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DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
INSULATION:	- SPLICE NEAR A REMOVABLE END	- INSTALL THE HEAT-SHRINK ON THE SPLICE. THE SLEEVE P/N DEPENDS ON THE ZONE (SEE AIRCRAFT ZONING CHAPTER). . -55 deg.C TO 175 deg.C (-67 deg.F TO 347 deg.F) (HIGHT TEMPERATURE HEAT-SHRINK) E0484 "SILICONE" + NSA937494 OR E0718 "KYNAR" . -55 deg.C TO 160 deg.C (-67 deg.F TO 320 deg.F) ABS0061 "DR25TW" X2 OR ABS0916 "DR25" . - 55 deg.C TO 135 deg.C (-67 deg.F TO 320 deg.F) (LOW TEMPERATURE HEAT-SHRINK) E0216 OR NSA937211
		- REPLACE THE SPLICE + INSULATION
	- SPLICE AT A DISTANCE FROM A REMOVABLE END	REPLACE THE SPLICE + INSULATION
CONNECTION:		REPLACE THE SPLICE + INSULATION

S15 20 53 53 0 AAN0 01

R

Repair of Splices - Table of Damage Cases
Figure 001

EFF : ALL

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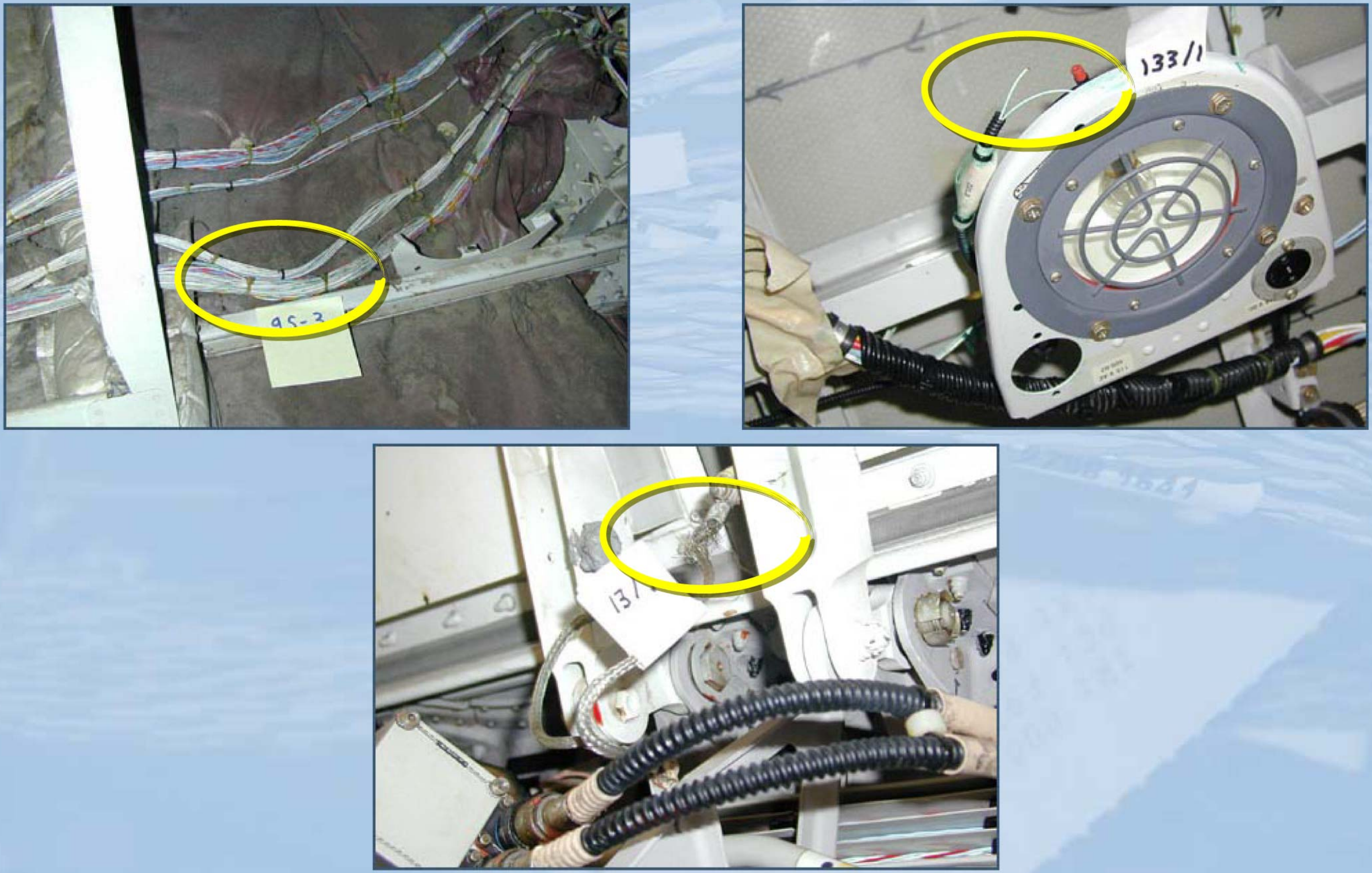
TERMINALS AND SPLICES

MAINTENANCE AND REPAIR PROCEDURES

PREVENTIVE MAINTENANCE PROCEDURE

How to find a risk of damage before it appears.
Check the adjacent areas.
Sagging phenomenon.
Slippage at attachments causes sagging.
Check the bundle upstream and downstream of the sagging to find location of excessive tension.
Corrective actions are in this case to install more accurate clamps or add self adhesive tape.
Installation of self adhesive tape.
Example of installation of self adhesive tape.
After cutting a sufficient length of tape, insert one end in the bundle by separating the bundle in two equal parts.
Wrap 100% first and 50% overlap on the length where the clamp will be installed.
Now at the other extremity, wrap 100% overlap and cut excessive length.
Now you are ready to install the clamp.
The clamp will be located in the middle of the installation.
Always check the general condition of the wire / bundle to prevent any other damage, in other words find and correct the reason of the damage.
Over length can also cause damage and this is the process to store this over length.
An other precaution is to protect the area where you have to work by placing environmental protection.
Never forget to clean the area after working.
Do not hesitate to clean adjacent areas.



PREVENTIVE MAINTENANCE PROCEDURE

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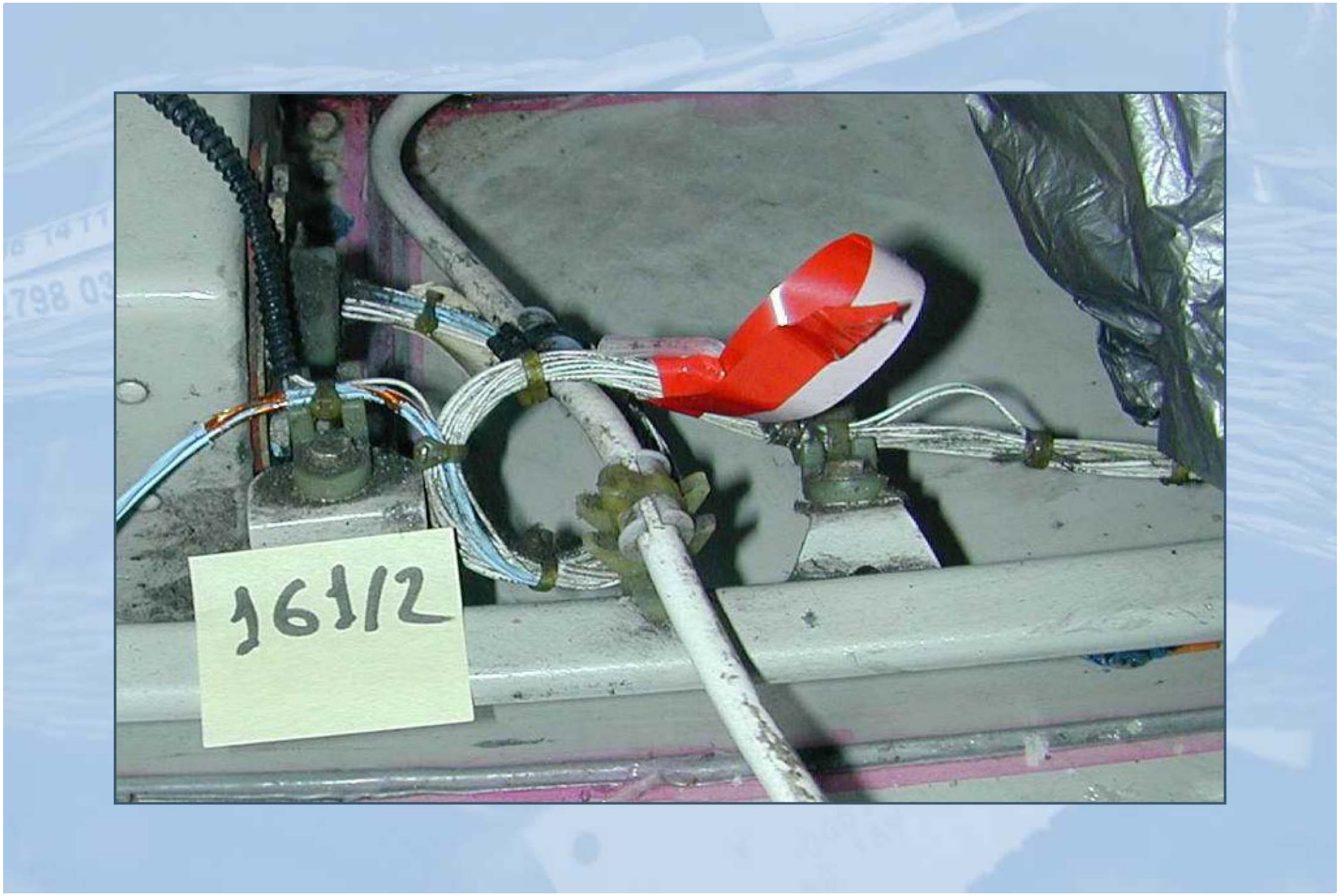

PREVENTIVE MAINTENANCE PROCEDURE

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

CHECK FOR AGEING - DESCRIPTION AND OPERATION

1. General
   This chapter gives general inspections of the electrical installation to find (and repair) possible deterioration because of ageing.

2. Bundle Sagging

   A. Description of wire bundle sagging
      Bundle sagging is an increase in the length of bundle between two adjacent attachments that causes the bundle to hang down too much.
      Sagging occurs when the bundle gradually moves from its initial trajectory because of slippage at its attachments.
      When this movement starts, it usually gets faster with time.
      Sagging can cause:
      - Possible loss of segregation,
      - Wire damage because of chafing between the bundle and the adjacent structure and/or equipment and/or wiring,
      - Drip loops to become straight,
      - Too much tension in the bundle between attachments or at connectors.

   B. How to find bundle sagging on the aircraft.
   Note: Cable bundles usually hang down a little between adjacent attachments. This is not an incorrect condition and action is necessary only if the bundle moves from its initial trajectory and hangs down too much between two adjacent attachments.
      To find sagging, look for these conditions:
      - A bundle that hangs down too much between two adjacent attachments (Ref.20-52-12),
      - No more segregation between bundles (Ref.20-52-12),
      - Risk of chafing between the bundle and the adjacent structure and/or equipment and/or wiring (Ref.20-52-12),
      - Missing drip loops/bundle pulled straight.
      (Ref. Fig. 001)
      Note: The increased lenght between the attachments can come from:
      - Drip loops,
      - Stowed bundle,
      - Play in the bundle at other locations.

   C. Repair Procedure
      Do a check of the bundle installation upstream and downstream of the sagging to find the location(s) where there is too much tension or reduced length.
      (Ref. Fig. 001)

CAUTION: TEMPORARILY SUPPORT AND/OR INSTALL PROTECTION FOR THE BUNDLE WHEN YOU REMOVE BUNDLE ATTACHMENTS TO PREVENT DAMAGE TO THE BUNDLE.

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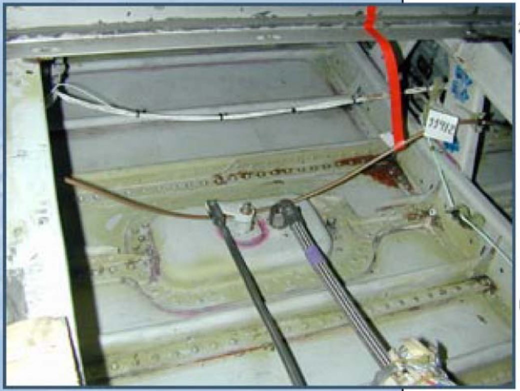
PREVENTIVE MAINTENANCE PROCEDURE



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ELECTRICAL STANDARD PRACTICES MANUAL

CHECK FOR AGEING - DESCRIPTION AND OPERATION

1. General
This chapter gives general inspections of the electrical installation to find (and repair) possible deterioration because of ageing.

2. Bundle Sagging

A. Description of wire bundle sagging
Bundle sagging is an increase in the length of bundle between two adjacent attachments that causes the bundle to hang down too much.
Sagging occurs when the bundle gradually moves from its initial trajectory because of slippage at its attachments.
When this movement starts, it usually gets faster with time.
Sagging can cause:
- Possible loss of segregation,
- Wire damage because of chafing between the bundle and the adjacent structure and/or equipment and/or wiring,
- Drip loops to become straight,
- Too much tension in the bundle between attachments or at connectors.

B. How to find bundle sagging on the aircraft.
Note: Cable bundles usually hang down a little between adjacent attachments. This is not an incorrect condition and action is necessary only if the bundle moves from its initial trajectory and hangs down too much between two adjacent attachments.
To find sagging, look for these conditions:
- A bundle that hangs down too much between two adjacent attachments (Ref.20-52-12),
- No more segregation between bundles (Ref.20-52-12),
- Risk of chafing between the bundle and the adjacent structure and/or equipment and/or wiring (Ref.20-52-12),
- Missing drip loops/bundle pulled straight.
(Ref. Fig. 001)
Note: The increased lenght between the attachments can come from:
- Drip loops,
- Stowed bundle,
- Play in the bundle at other locations.

C. Repair Procedure
Do a check of the bundle installation upstream and downstream of the sagging to find the location(s) where there is too much tension or reduced length.
(Ref. Fig. 001)

CAUTION: TEMPORARILY SUPPORT AND/OR INSTALL PROTECTION FOR THE BUNDLE WHEN YOU REMOVE BUNDLE ATTACHMENTS TO PREVENT DAMAGE TO THE BUNDLE.

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PREVENTIVE MAINTENANCE PROCEDURE

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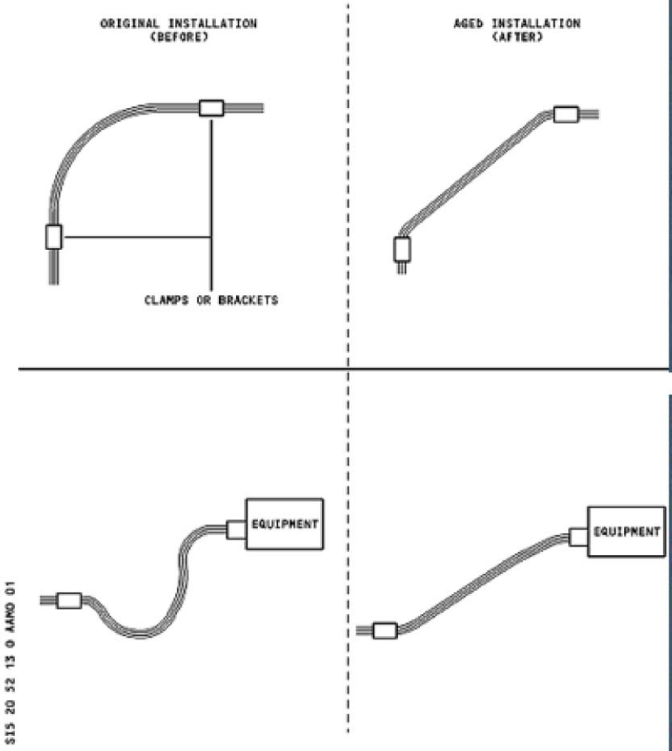
EXAMPLES OF REDUCED LENGTH/EXCESSIVE TENSION



Check For Ageing - Reduced length or exessive tension example
Figure 001

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PREVENTIVE MAINTENANCE PROCEDURE

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AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

Remove all the bundle attachments between the sagging and the location(s) of reduced length/too much tension.
Re-distribute the sagged length to the location of the excessive tension/reduced length.
Adjust the bundle and do a check for.
- Loss of segregation,
- Risk of chafing,
- Too much tension,
- Presence of drip loops,

Adjust the bundle again if necessary,
Install self adhesive tape ASNA5107 (Ref. process described below) at the locations of all removed attachments,
Install the bundle attachments, (Ref. procedure below).

Note: For correct attachment, the internal diameter of the attachment, to be installed must be slightly smaller than the diameter of the bundle with its adhesive tape.

Pull lightly on the bundle to make sure that it is correctly attached.

CAUTION: IT IS NECESSARY TO PULL FIRMLY ON THE TAPE DURING ALL THE BELOW DESCRIBED TAPE INSTALLATION PROCESS TO ENSURE A GOOD TIGHTENING OF THE TAPE ON THE BUNDLE.

D. ASNA5107 Self Adhesive Tape Installation Procedure.

(1) General Procedure
- Remove all cable ties or lacing tape at all securing locations over a lenght of 50 to 60 mm on each side of the attachment.
- Insert one end of a piece of self adhesive tape ASNA5107 through the bundle to separate the bundle in 2 equal parts . (Ref. Fig. 002)
  The tape must come out of the bundle by 10 to 20 mm.
- Pull firmly on the tape and wrap it around the bundle.
  NOTE: The first wrap and the last wrap must have a 100% overlap. The other wraps must have a 50% overlap.
- Attach the two ends of the tape with cable ties NSA935401. (Ref. Fig. 003)
- Install all the removed cable ties.

(2) Procedure for an over-lenght stowage loop (Ref. Fig. 004)
- Remove all cable ties or lacing tape on the over-length part of the bundle.
- Make a loop to stow the bundle over-length.
- At the location where the loop touches the bundle, insert one end of the adhesive tape between the two parts of the bundle.
- Install two cable ties NSA935401 at each side of the location of the adhesive tape.
- Pull firmly on the tape and wrap it around the bundle.

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PREVENTIVE MAINTENANCE PROCEDURE

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-52-13 - Check for Ageing - Installation of Adhesive Tape	

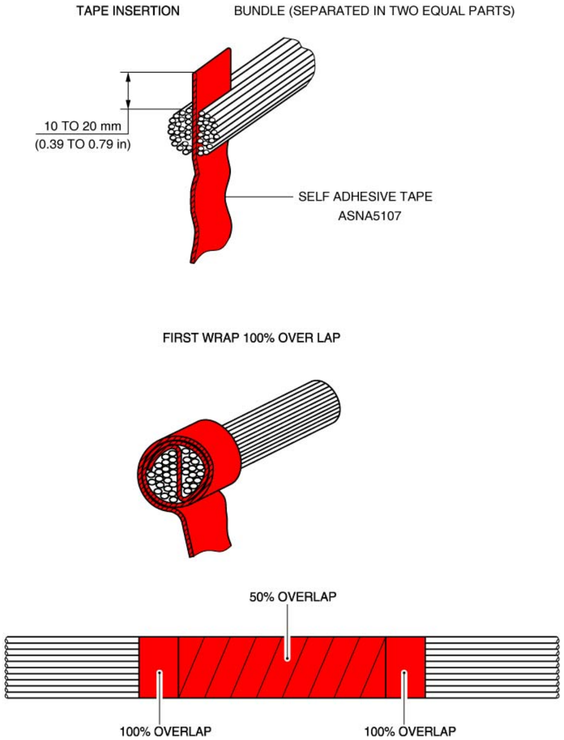

Figure 002 (Sheet 1) / 20-52-13 - Check for Ageing - Installation of Adhesive Tape

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 003 (Sheet 1) / 20-52-13 - Check for Ageing - Installation of Bundle Attachment	

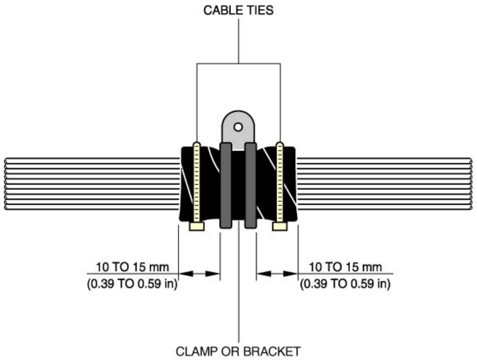

Figure 003 (Sheet 1) / 20-52-13 - Check for Ageing - Installation of Bundle Attachment

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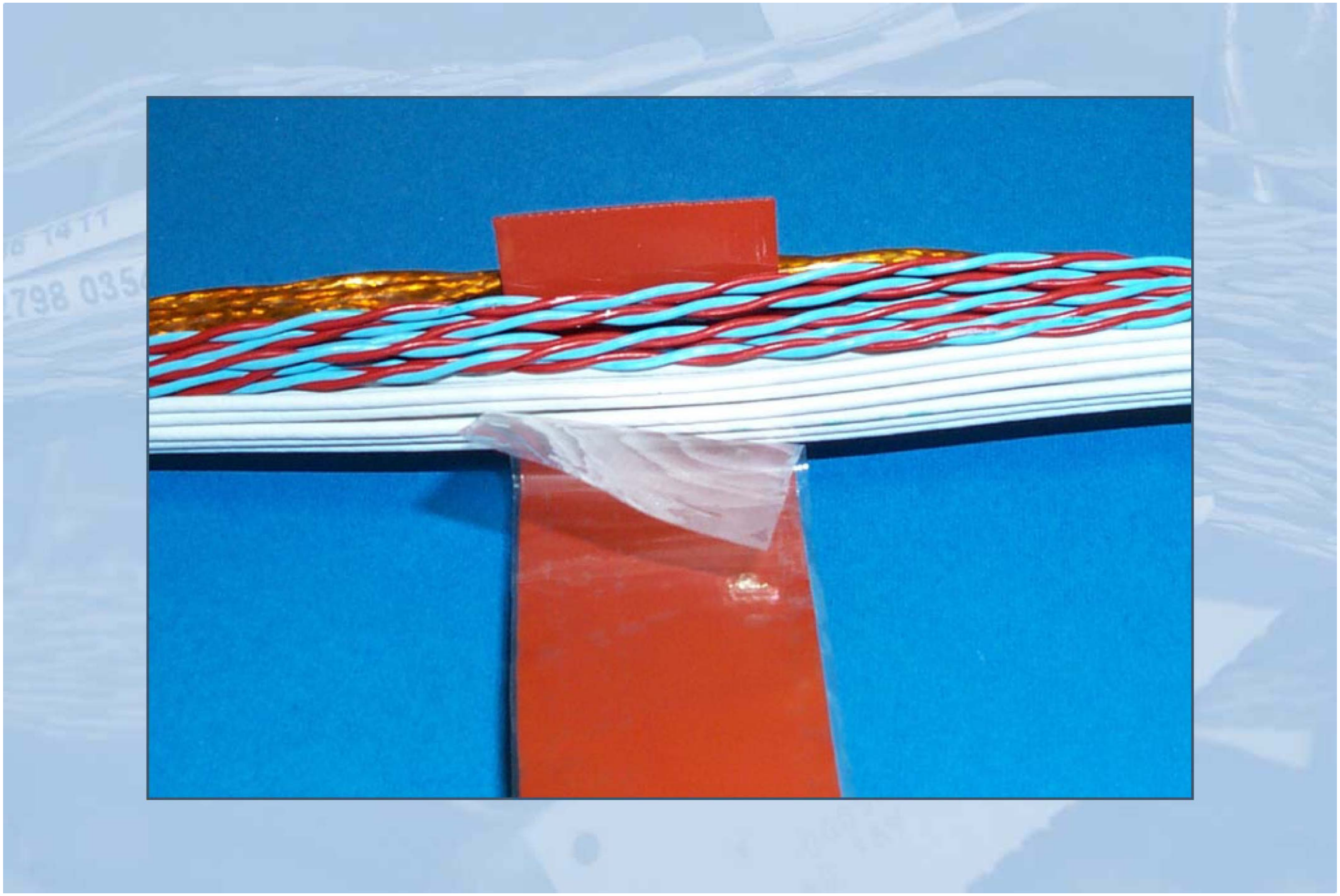
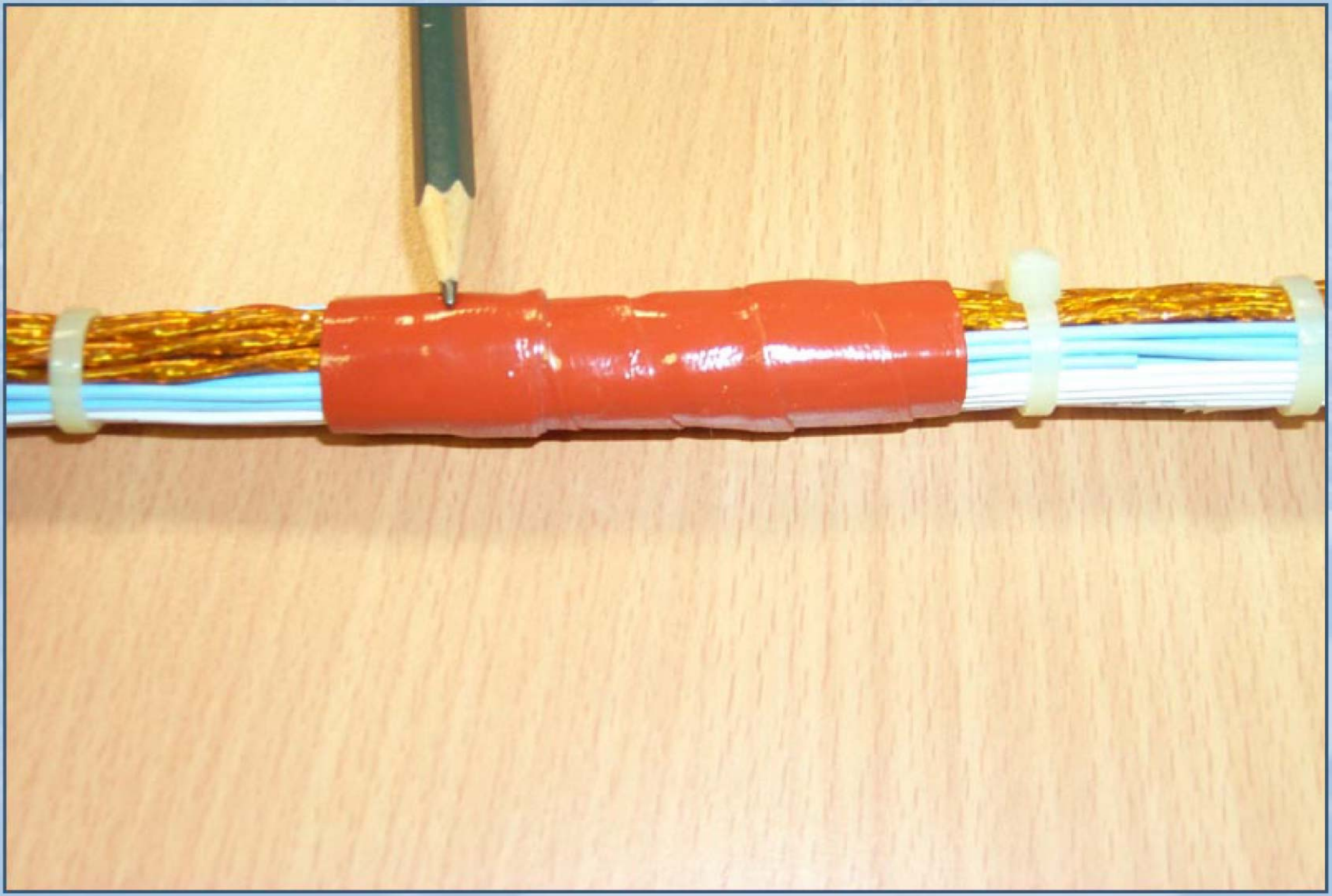
PREVENTIVE MAINTENANCE PROCEDURE

PREVENTIVE MAINTENANCE PROCEDURE

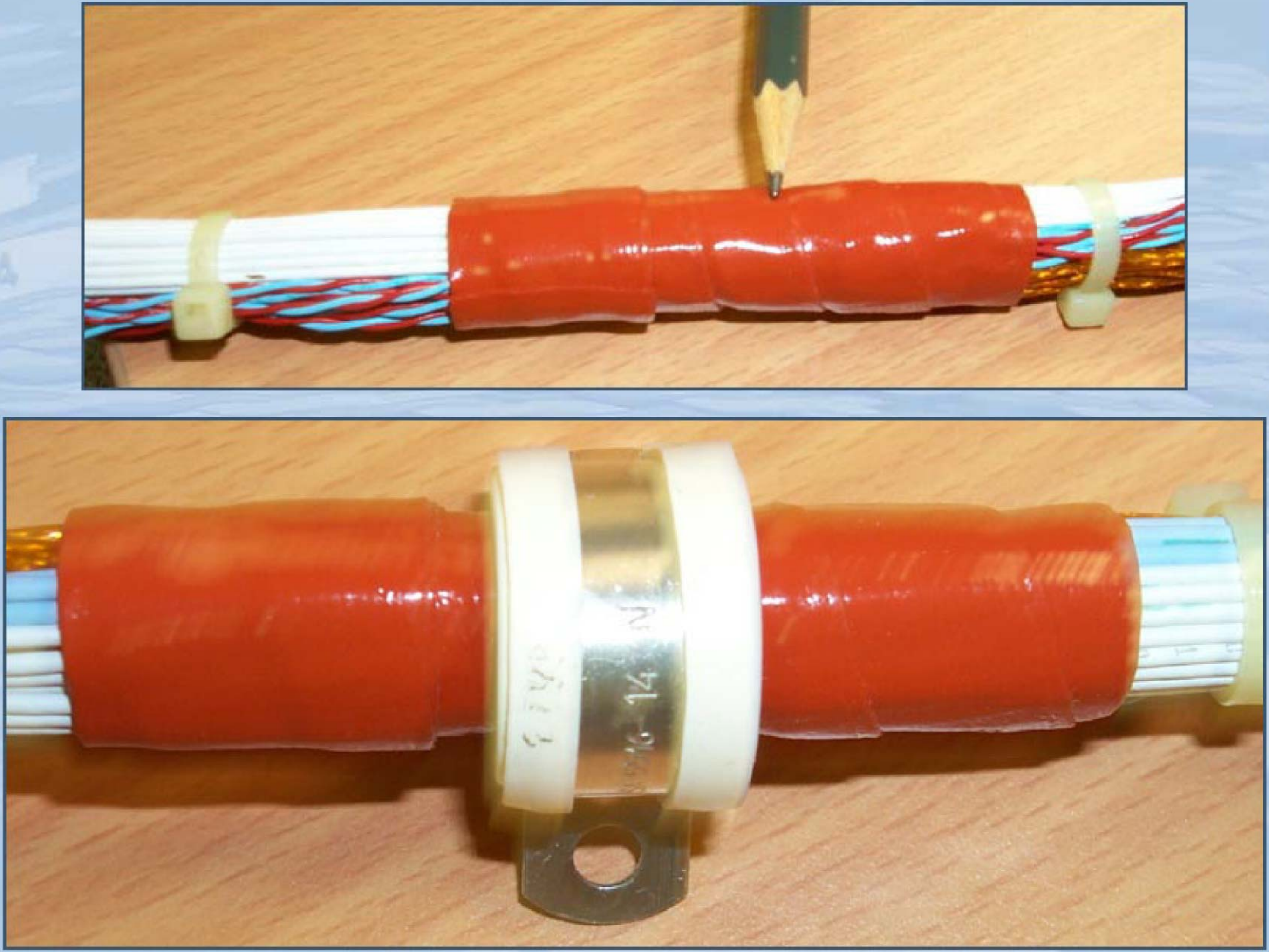


PREVENTIVE MAINTENANCE PROCEDURE

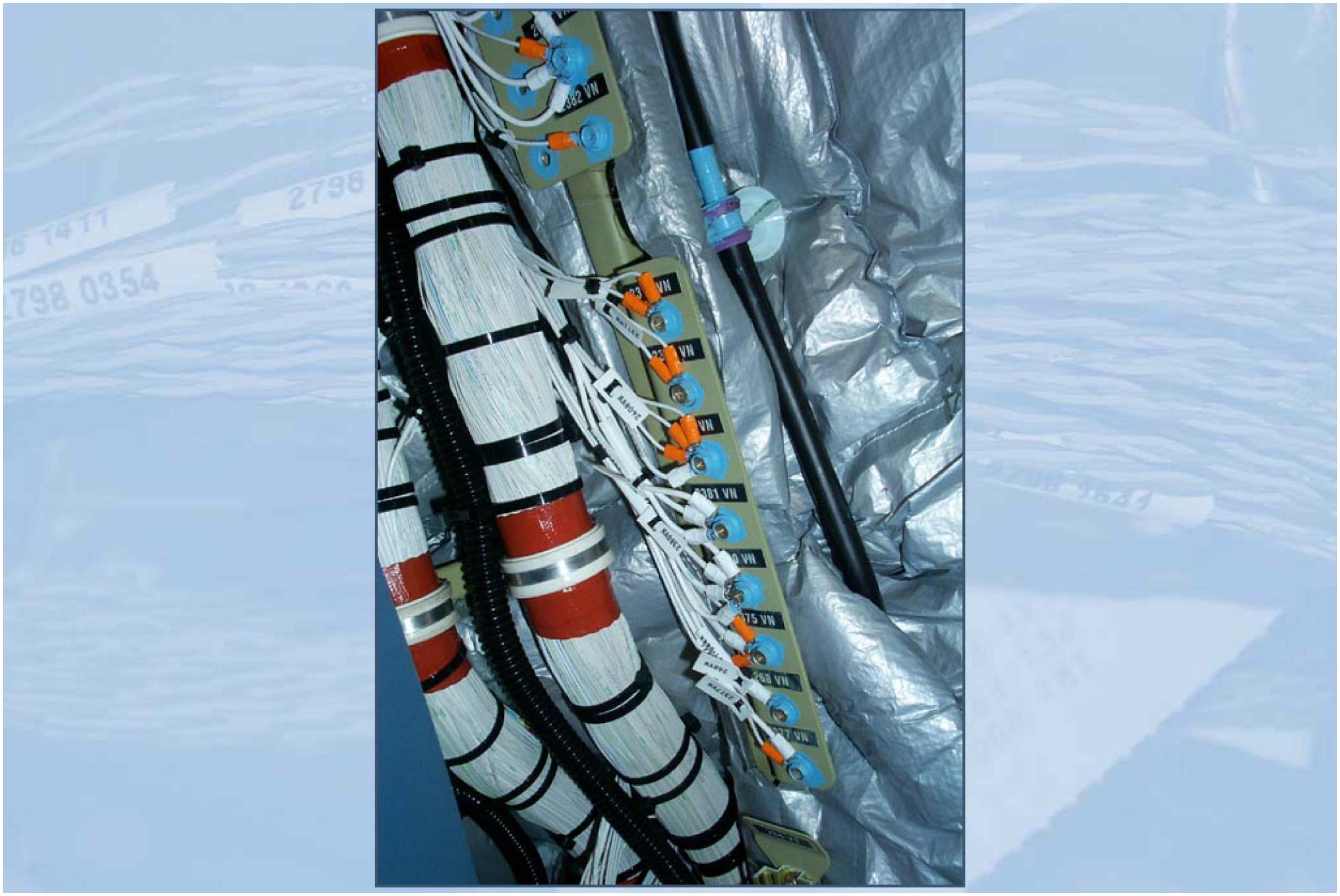
PREVENTIVE MAINTENANCE PROCEDURE



PREVENTIVE MAINTENANCE PROCEDURE



PREVENTIVE MAINTENANCE PROCEDURE



PREVENTIVE MAINTENANCE PROCEDURE

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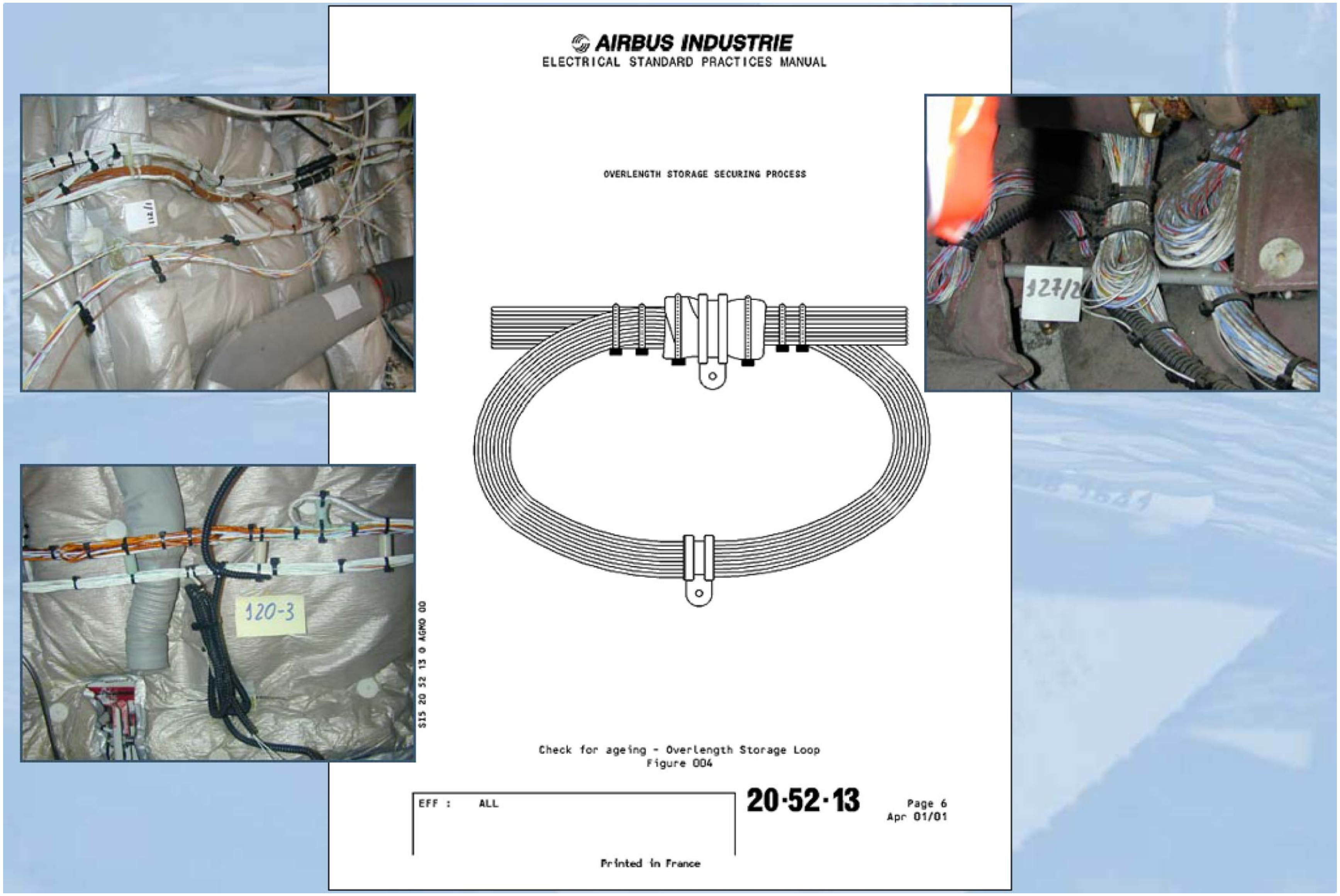
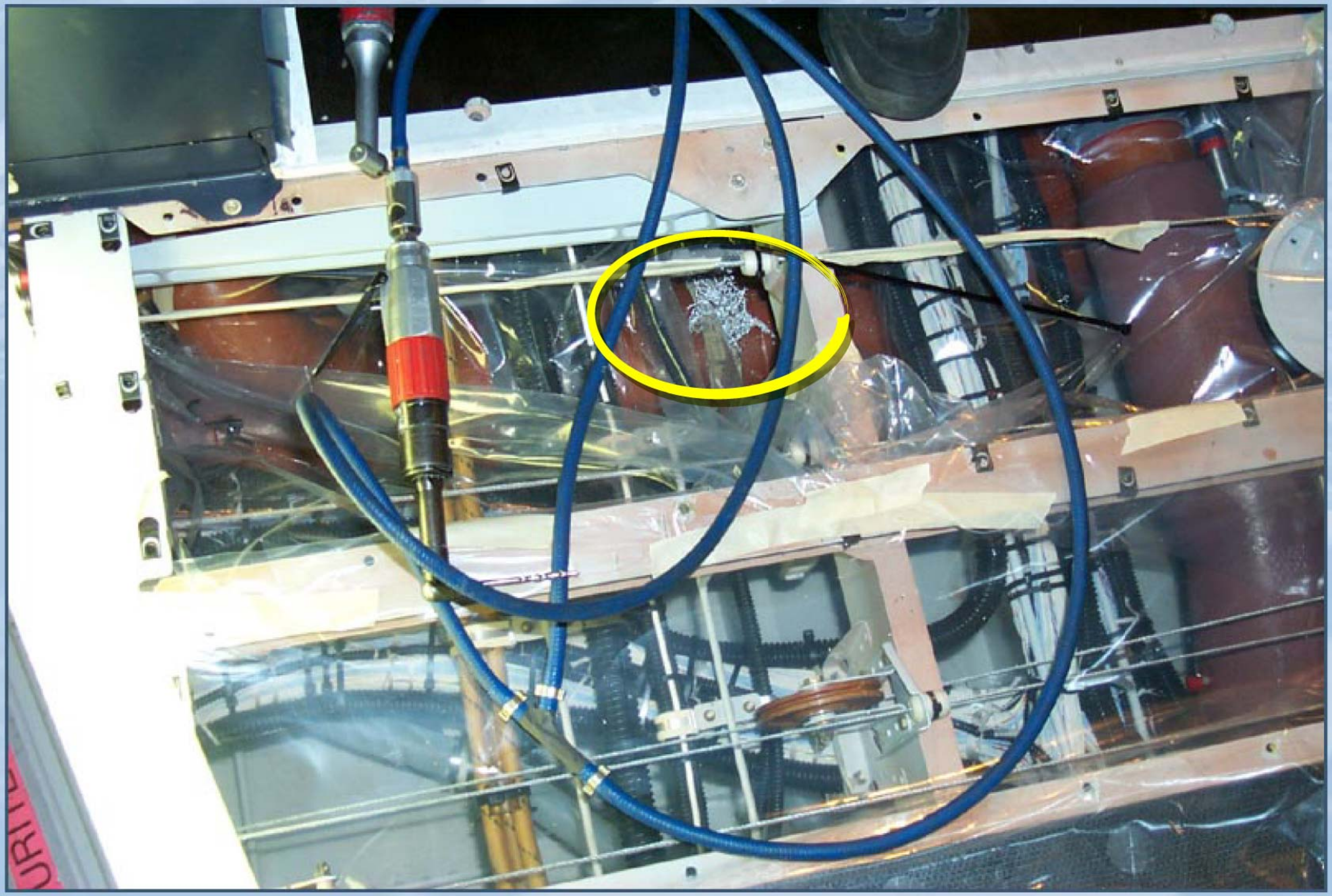


PREVENTIVE MAINTENANCE PROCEDURE



PREVENTIVE MAINTENANCE PROCEDURE

PREVENTIVE MAINTENANCE PROCEDURE

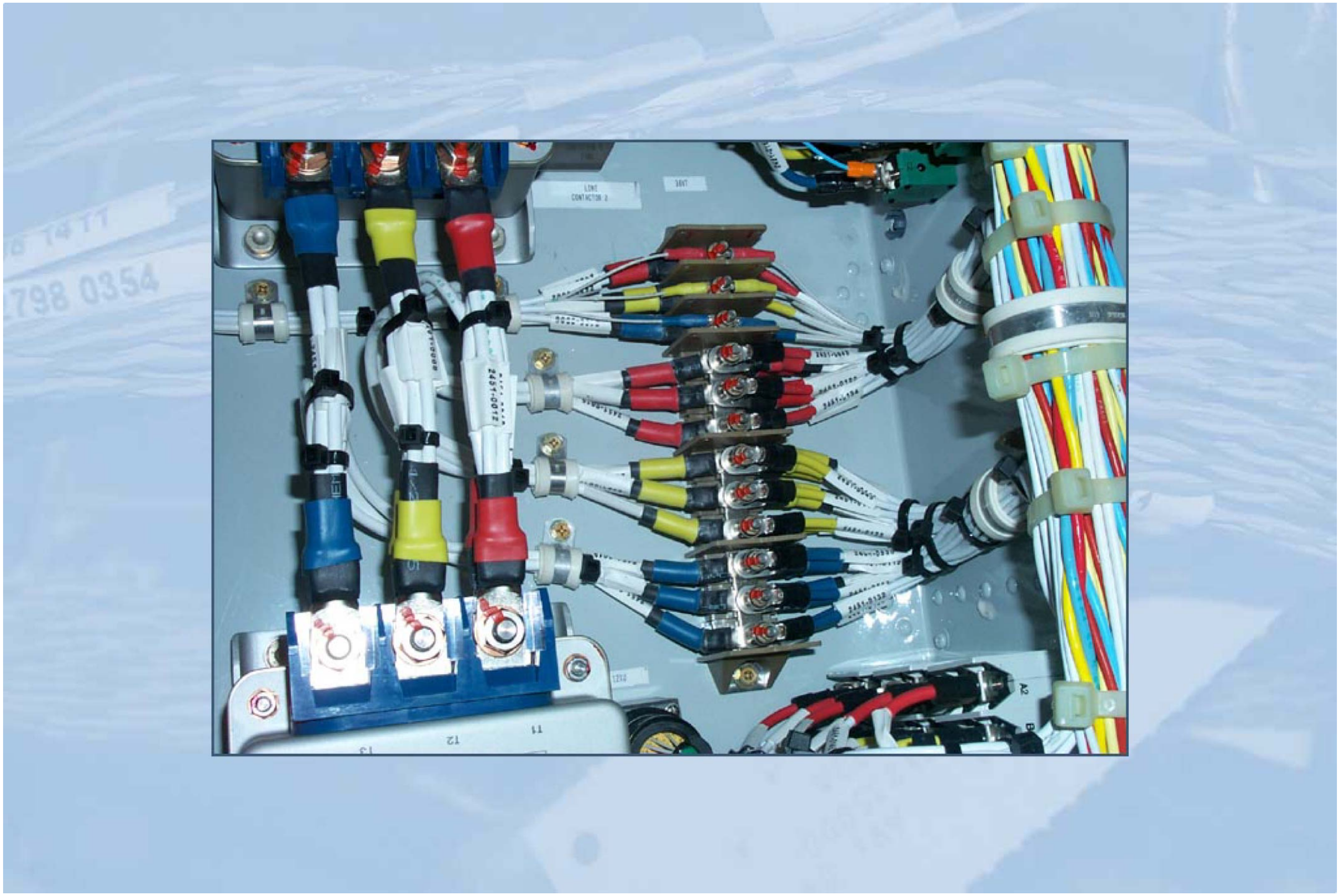
PREVENTIVE MAINTENANCE PROCEDURE

SLEEVING

IDENTIFICATION SLEEVES

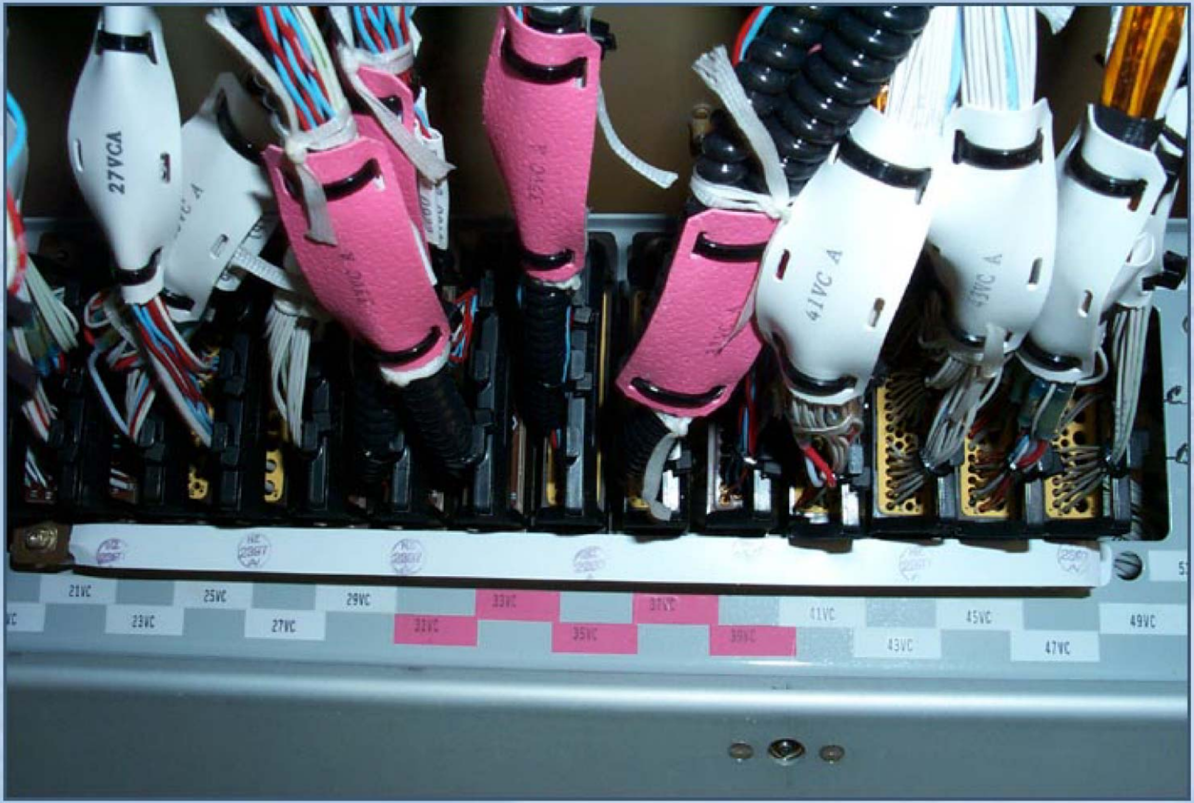
Sleeving.
Identification sleeves.
Cable and plug identification sleeves.
Examples of sleeves used for identification of electrical wires or components.
Other examples of identification sleeves.
Cables without markings are very short or non printable like the BF type located inside small VUs.
In a small VU:
- The sleeves to identify the connection are yellow with black printing.
- The sleeves to identify the components are white with black printing.
- The sleeves to identify the EFCS components are pink with black printing.

Here, an example of another VU panel.
These identification sleeves are used for the cavity indication of the item to connect.



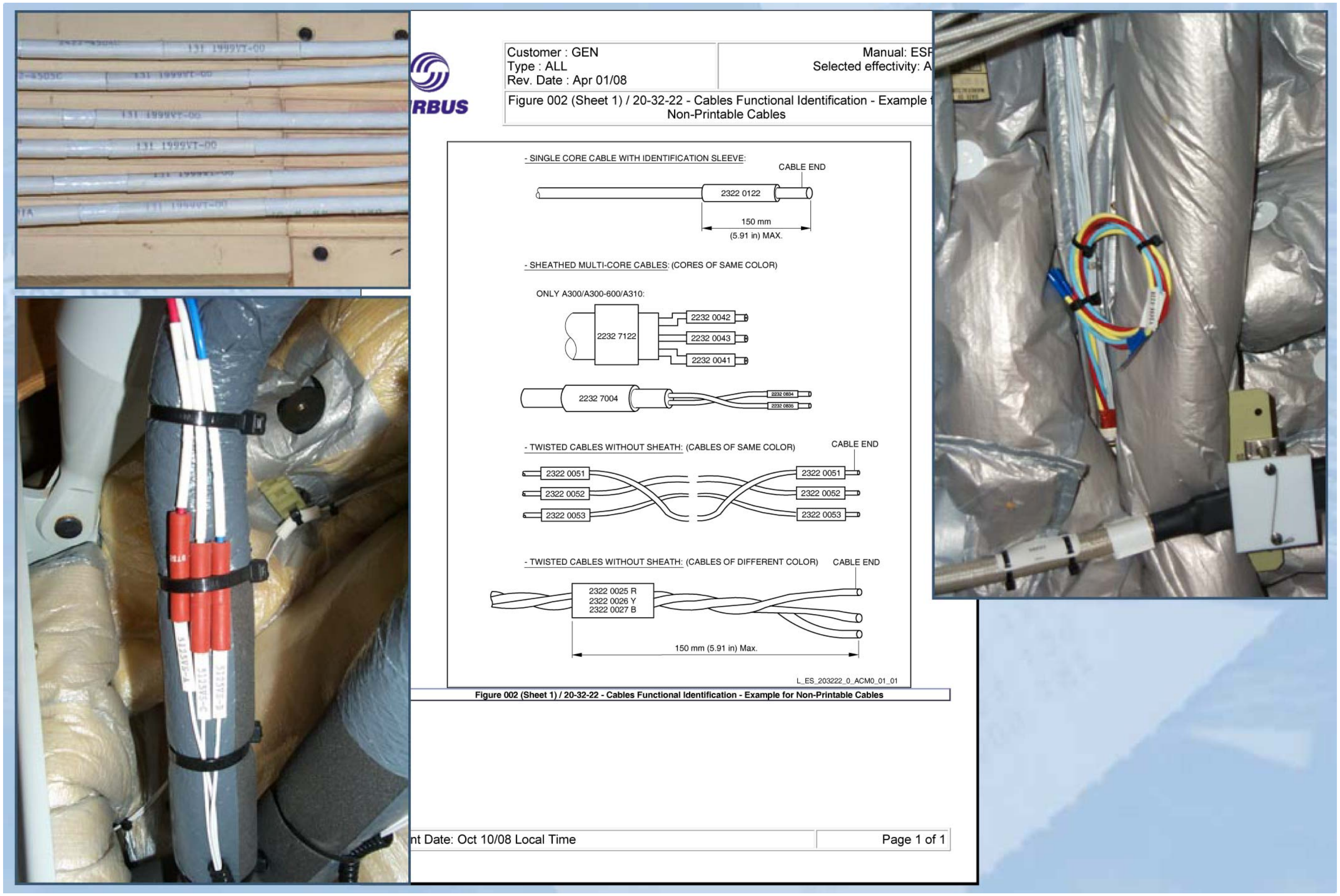
IDENTIFICATION SLEEVES

X8U08481 - X0332T0 - XM2029000000001



IDENTIFICATION SLEEVES

X8U08481 - X0332T0 - XM2029000000001



IDENTIFICATION SLEEVES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 003 (Sheet 1) / 20-32-22 - Cables Functional Identification - Example for Non-Printable Cables	

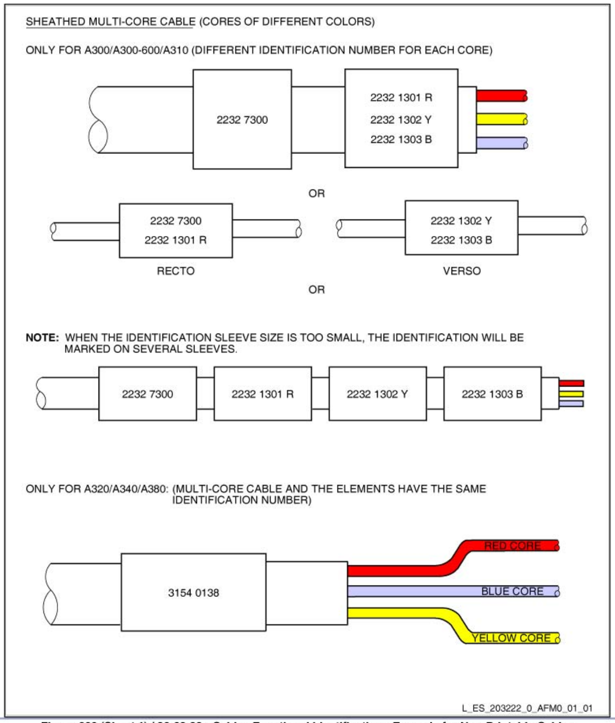


Figure 003 (Sheet 1) / 20-32-22 - Cables Functional Identification - Example for Non-Printable Cables

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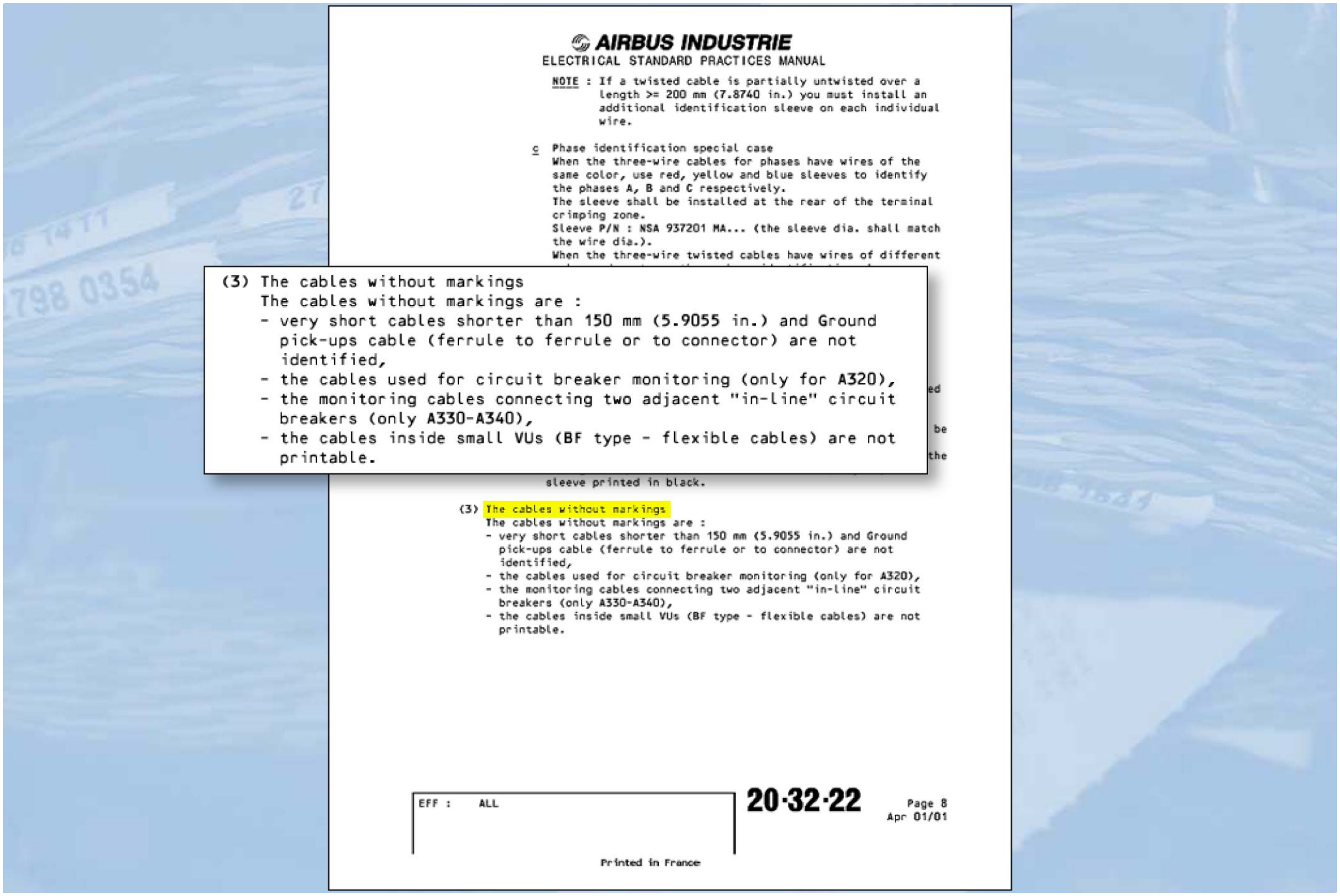
IDENTIFICATION SLEEVES

X8U08481 - X0332T0 - XM202900000001



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NOTE : If a twisted cable is partially untwisted over a length >= 200 mm (7.8740 in.) you must install an additional identification sleeve on each individual wire.

c Phase identification special case
When the three-wire cables for phases have wires of the same color, use red, yellow and blue sleeves to identify the phases A, B and C respectively.
The sleeve shall be installed at the rear of the terminal crimping zone.
Sleeve P/N : NSA 937201 MA... (the sleeve dia. shall match the wire dia.).
When the three-wire twisted cables have wires of different

(3) The cables without markings
The cables without markings are :
- very short cables shorter than 150 mm (5.9055 in.) and Ground pick-ups cable (ferrule to ferrule or to connector) are not identified,
- the cables used for circuit breaker monitoring (only for A320),
- the monitoring cables connecting two adjacent "in-line" circuit breakers (only A330-A340),
- the cables inside small VUs (BF type - flexible cables) are not printable.

sleeve printed in black.

(3) The cables without markings
The cables without markings are :
- very short cables shorter than 150 mm (5.9055 in.) and Ground pick-ups cable (ferrule to ferrule or to connector) are not identified,
- the cables used for circuit breaker monitoring (only for A320),
- the monitoring cables connecting two adjacent "in-line" circuit breakers (only A330-A340),
- the cables inside small VUs (BF type - flexible cables) are not printable.

EFF : ALL

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Apr 01/01

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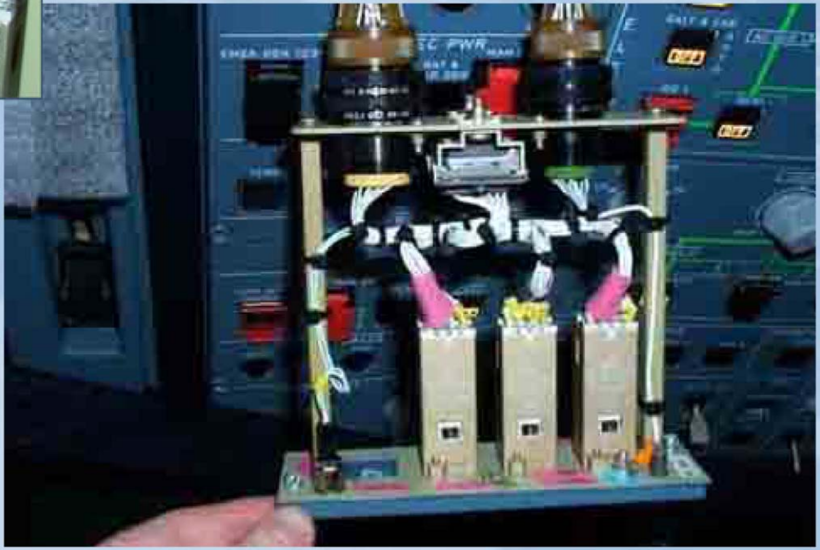
IDENTIFICATION SLEEVES



IDENTIFICATION SLEEVES

IDENTIFICATION SLEEVES

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IDENTIFICATION SLEEVES

X8U08481 - X0332T0 - XM2029000000001

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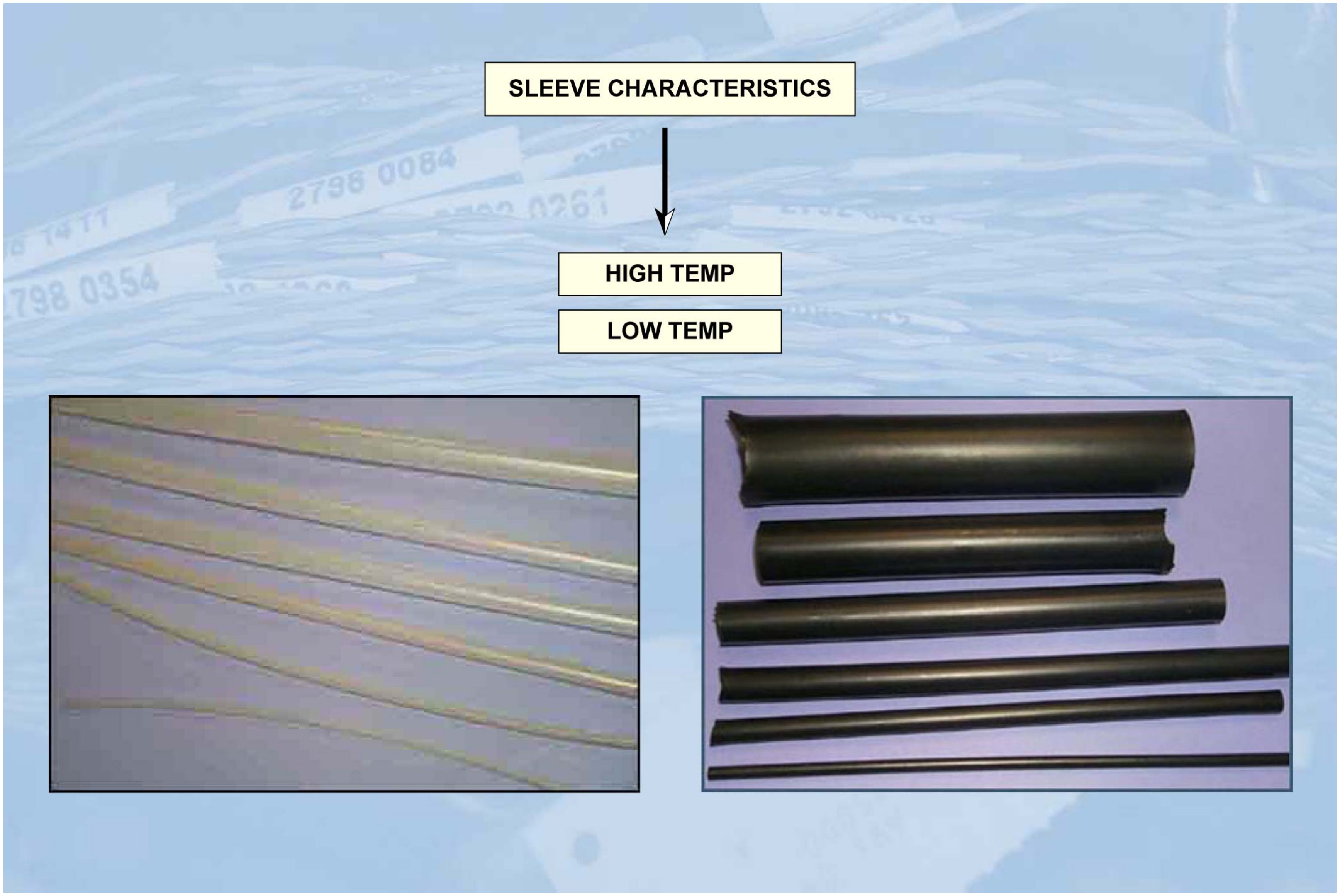
SLEEVING

SHRINK SLEEVES

How and where to install sleeves.
Depending on the supplier the sleeves color may be different.
The correct PN must be used according to the specification.
Sleeves are used for protection and/or for isolation.
Generally, during wire repairs you have to install sleeves.
Selection of the sleeve depending on characteristics.
The sleeves can also be used as shield stops.
Procedure:
- Cut and remove the insulation.
- Move the shield backward.
- Install the heat shrinkable sleeve.
- Heat shrink the sleeve.

Tool information in 20-25-31.



SHRINK SLEEVES

X8U08481 - X0332T0 - XM202900000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-42-12 - SHRINK SLEEVES (Airbus)	

SHRINK SLEEVES (Airbus)

SHRINK SLEEVES - DESCRIPTION AND OPERATION

1. General
   This chapter gives the description and the primary characteristics of heat shrink sleeves.
   The primary function of these sleeves is to:
   - Give protection to the terminal (Ref. 20-48-1X),
   - Give protection to the connector cavities at the rear of the contact (Ref. 20-48-2X),
   - Repair the wires in some cases (Ref. 20-53-2X),
   - Give protection to the harnesses and electrical bundles.
     The description and procedures for the installation of heat shrink sleeves used to give protection to wire bundles are gi
     (Ref. 20-33-34).
     Shrink sleeves installed on aircraft have the codes that follow:
   - Low temperature shrink sleeves:
     ABS0061
     ABS0836
     ABS0916
     E0126 (ex NSA937211)
     E0718 (ex NSA937494)
     NSA937502
   - High temperature shrink sleeves:
     E0484
     DAN132
     NSA937210
     NSA937493
2. Low temperature shrink sleeves
   A. ABS0061
      (Ref. Fig. 001)
      (1) P/N Identification

```
ABS0061 B 06
   |    |  |
   |    |  ------------ Diameter code
   |    --------------- Color code : B = Black
   -------------------- Standard P/N
```

      (2) P/N Characteristics
         (a) Temperature
            Minimum operating temperature is -55 deg.C (-67.00 deg.F) .
            Maximum operating temperature is 150 deg.C (302.00 deg.F) .
            Shrinkage temperature is 150 deg.C (302.00 deg.F) .
         (b) Length
            Supply length is 75 mm.
         (c) Diameter code and shrinking tools
            (Ref. Fig. 001)
   B. ABS0836
      (Ref. Fig. 002)
      (1) P/N Identification

```
ABS0836 B 01
   |    |  |
   |    |  ------------ Diameter code
   |    --------------- Color code : B = Black
   -------------------- Standard P/N
```

      (2) P/N Characteristics
         (a) Temperature
            Minimum operating temperature is -55 deg.C (-67.00 deg.F) .
            Maximum operating temperature is 80 deg.C (176.00 deg.F) .
            Shrinkage temperature is 125 deg.C (257.00 deg.F) to 350 deg.C (662.00 deg.F) .
         (b) Length

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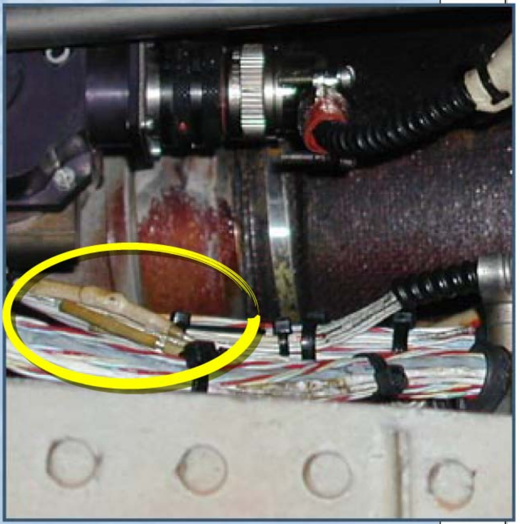
SHRINK SLEEVES

X8U08481 - X0332T0 - XM20290000000001



Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 009 (Sheet 1) / 20-53-22 - Repair of Screened Cables - Repair Procedure Table

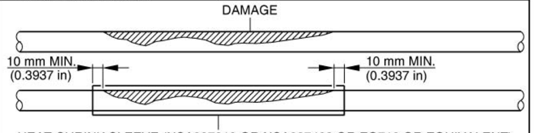
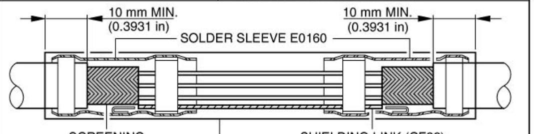
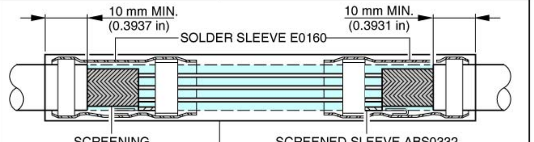
REPAIR	TYPE	GENERAL DESCRIPTION	CONDITIONS OF APPLICATION
2	A	- WRAP WITH PTFE TAPE MATERIAL No 05-116	- LENGTH OF THE DAMAGE NOT IMPORTANT **NOTE:** WHEN THE SCREENING IS DAMAGED, PUT THE STRANDS TO THEIR ORIGINAL POSITION TO AVOID DAMAGE TO THE CABLE INSULATION
	B	- DISCONNECT THE CABLE TERMINATION - I NSTALL THE APPLICABLE HEAT-SHRINK SLEEVE ON THE DAMAGE (REF. SLEEVES ALLOCATION TABLE)	- ONLY NEAR THE ENDS BECAUSE OF ACCESS TO THE DAMAGED LENGTH. - **DAMAGE** ⩽ 300 mm (11.8110 in)
			
	A	REF. § 3. PROCEDURE REF. SOLDER. REPAIR SLEEVES ALLOCATION TABLE	- ONLY NEAR THE ENDS BECAUSE OF ACCESS TO THE DAMAGED LENGTH. - SINGLE-CORE NOT DAMAGED OR REPAIRED WITHOUT SPLICE. - **DAMAGE** ⩽ 200 mm (7.8740 in)
			
	D	REF. § 3. PROCEDURE REF. SOLDER. REPAIR SLEEVES ALLOCATION TABLE	- ONLY NEAR THE ENDS BECAUSE OF ACCESS TO THE DAMAGED LENGTH. - SINGLE-CORE NOT DAMAGED OR REPAIRED WITHOUT SPLICE.
			

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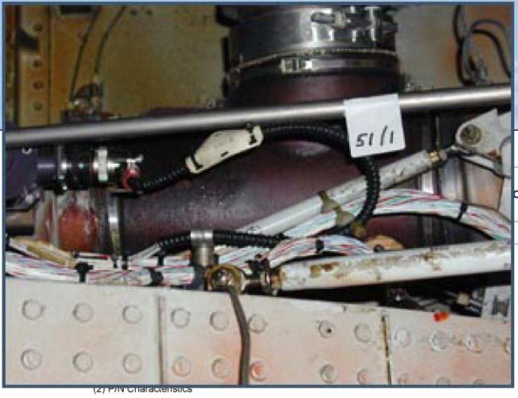
Figure 009 (Sheet 1) / 20-53-22 - Repair of Screened Cables - Repair Procedure Table

Print Date: Oct 10/08 Local Time

Page 1 of 1

SHRINK SLEEVES

X8U08481 - X0332T0 - XM202900000001



Manual: ESPM
cted effectivity: ALL

(2) P/N Characteristics

(a) Temperature
Minimum operating temperature is -55 deg.C (-67.00 deg.F) .
Maximum operating temperature is 150 deg.C (302.00 deg.F) .
Shrinkage temperature is 150 deg.C (302.00 deg.F) .

(b) Length
Supply length is 75 mm.

(c) Diameter code and shrinking tools
(Ref. Fig. 001)

B. ABS0836
(Ref. Fig. 002)

(1) P/N Identification

```
ABS0836 B 01
   |    | |
```

2. Low temperature shrink sleeves

A. ABS0061
(Ref. Fig. 001)

(1) P/N Identification

```
ABS0061 B 06
   |    |  |
   |    |  ------------ Diameter code
   |    --------------- Color code : B = Black
   -------------------- Standard P/N
```

(2) P/N Characteristics

(a) Temperature
Minimum operating temperature is -55 deg.C (-67.00 deg.F) .
Maximum operating temperature is 150 deg.C (302.00 deg.F) .
Shrinkage temperature is 150 deg.C (302.00 deg.F) .

Maximum operating temperature is 150 deg.C (302.00 deg.F) .
Shrinkage temperature is 150 deg.C (302.00 deg.F) to 175 deg.C (347.00 deg.F) .

(b) Length code

LENGTH CODE	LENGTH (MM)
No code	Coil

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AIRBUS

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-42-12 - Shrink Sleeves - P/N Characteristics and Shrinking Tools ABS0061

ABS0061BXX

DIAMETER CODE	INNER DIAMETER mm (in)		SHRINKING TOOL		
	BEFORE SHRINKING	AFTER SHRINKING	NORM	P/N	HEAD
05	6.4 (0.252)	3.2 (0.126)	RAYCHEM	695-01-A4-433 OR CV1981-42V-960W	PR12
06	9.5 (0.374)	4.8 (0.189)			
07	12.7 (0.500)	6.4 (0.252)			
08	19 (0.748)	9.5 (0.374)			

ABS0061BXX

TERMINAL E0422TRXXXX	ALUMINUM WIRE GAUGE (YU or YV TYPE)						
	6	4	3	2	1	0A	00
TR06XX	06	–	–	–	–	–	–
TR04XX	–	06	07	–	–	–	–
TR02XX	–	–	–	07	–	–	–
TR01XX	–	–	–	–	2 X 07	–	–
TR0AXX	–	–	–	–	–	08	–
TR00XX	–	–	–	–	–	–	08

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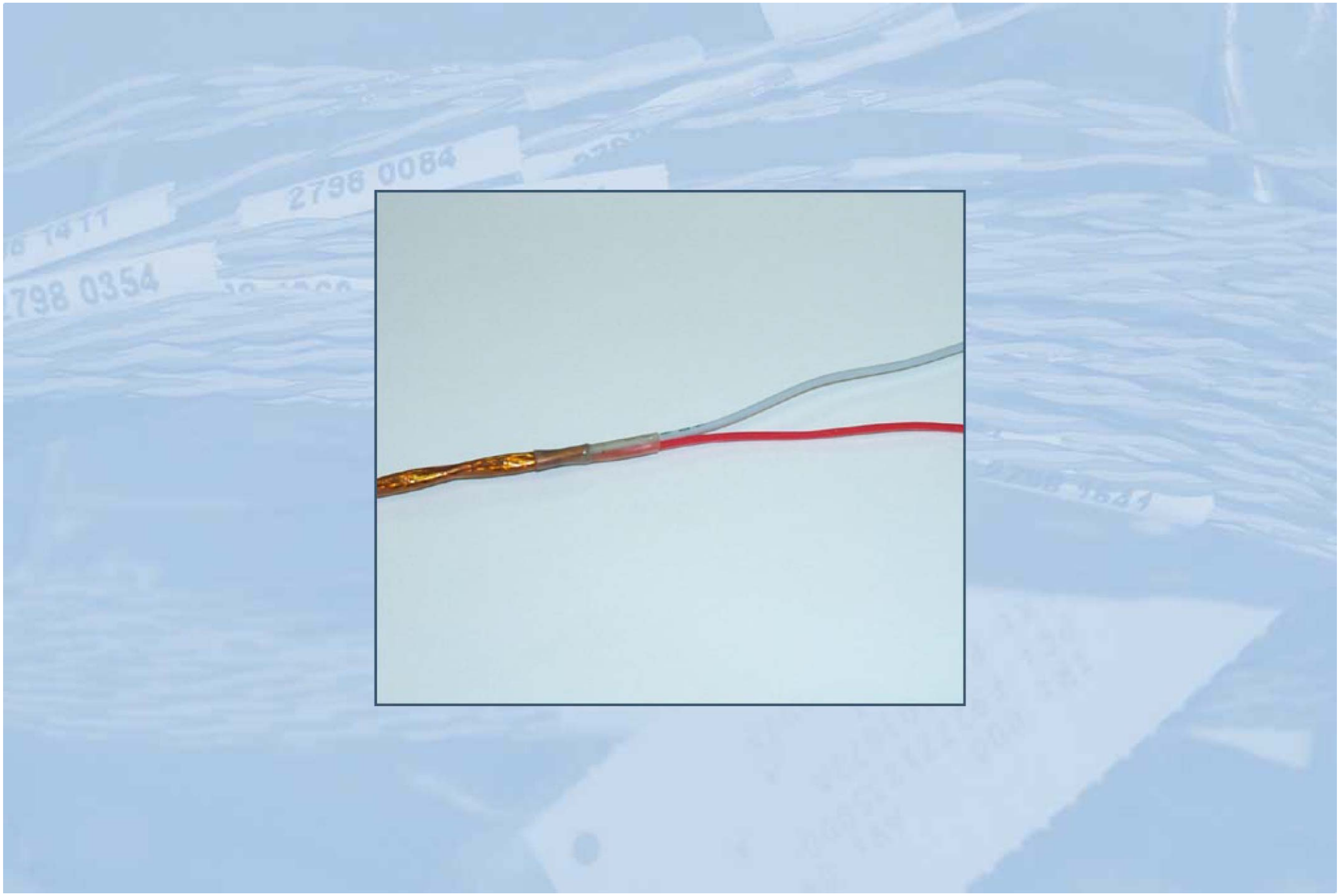
Figure 001 (Sheet 1) / 20-42-12 - Shrink Sleeves - P/N Characteristics and Shrinking Tools ABS0061

Print Date: Oct 10/08 Local Time | Page 1 of 1

SHRINK SLEEVES



SHRINK SLEEVES

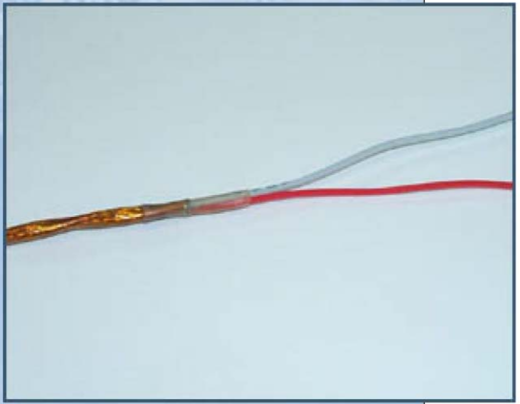
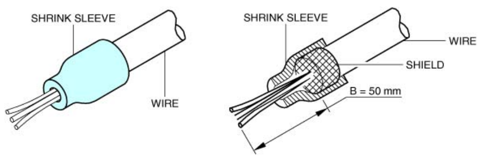


Figure 011 (Sheet 1) / 20-42-12 - Shrink Sleeves - P/N Characteristics and Shrinking Tools NSA937210

NSA937210 - MB01 00
- LENGTH (mm)
- DIAMETER CODE
- STANDARD P/N



NSA937210MBXXXX

DIAMETER CODE	INNER DIAMETER mm (in)		SHRINKING TOOL		
	BEFORE SHRINKING	AFTER SHRINKING	NORM	P/N	HEAD
01XX	2 (0.079)	0.6 (0.024)	RAYCHEM	695-01-A4-433 OR CV1981-42V-960W	PR13
02XX	3.2 (0.126)	0.9 (0.035)			
03XX	6.4 (0.252)	1.6 (0.063)			PR12
04XX	9.5 (0.374)	2.4 (0.094)			
05XX	12.7 (0.500)	3.7 (0.146)			
06XX	15.9 (0.626)	4.5 (0.177)			
07XX	19 (0.748)	5.7 (0.224)			
08XX	25.4 (1)	7.1 (0.279)			PR24
09XX	32 (1.260)	8.8 (0.346)			

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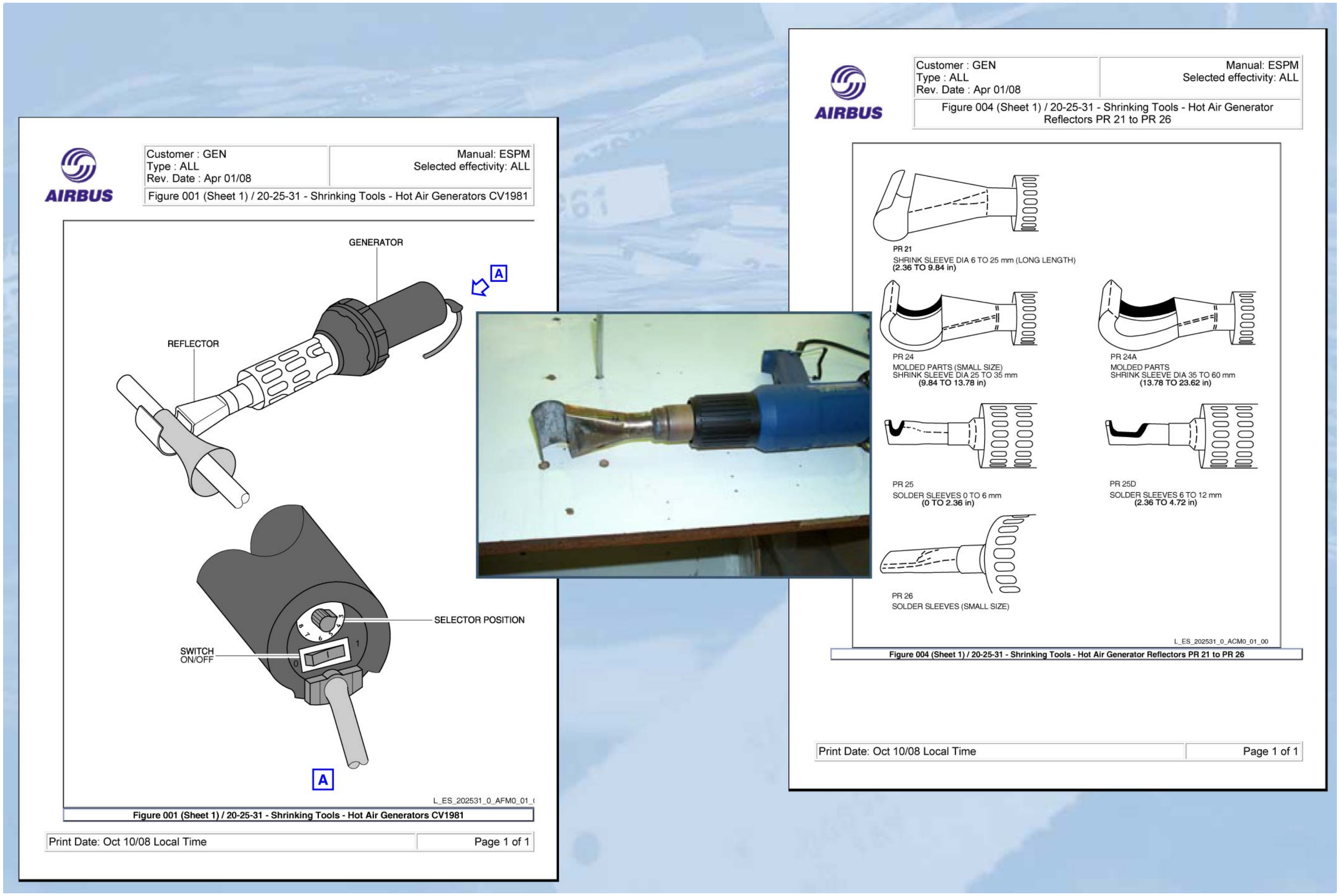
Figure 011 (Sheet 1) / 20-42-12 - Shrink Sleeves - P/N Characteristics and Shrinking Tools NSA937210

SHRINK SLEEVES



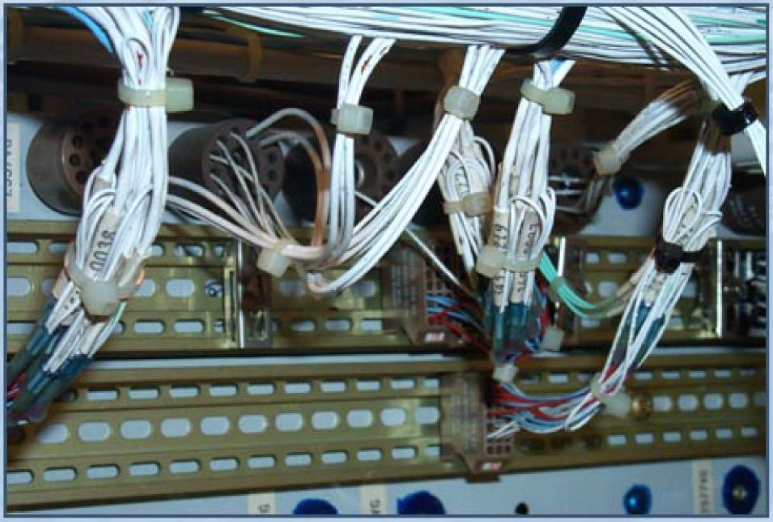
SHRINK SLEEVES

X8U08481 - X0332T0 - XM2029000000001

SLEEVING

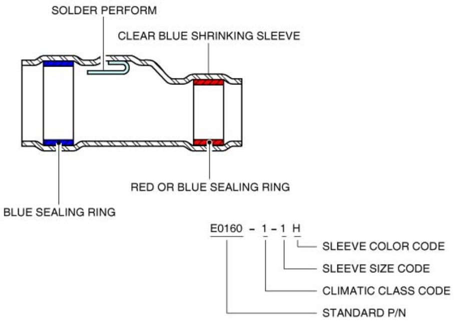
SCREEN BRAID GROUNDING SOLDER SLEEVES

Installation of solder sleeves.
Solder sleeve description :
- Solder preform.
- Sealing ring.
Solder sleeve installation method depends on the wire type.
Method A.
Tool information.
How to correctly shrink the solder sleeve.
Stripping of the wire.
Remove the insulation.
Adhesive tape can help you for insulation removal.
Untwist the braid.
Make 2 or 3 turns at the end of the insulation.
Cut the excess length.
Put the solder sleeve onto the wire.
Insert the bonding wire.
Installation of the assembly.
Heat the solder sleeve.
When the heat cycle is completed, remove the ferrule from the gun.
Now, check the quality of the installation.
Too much heating
Poor heating
Correctly heated.
Method E.
Method G.



SCREEN BRAID GROUNDING SOLDER SLEEVES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 004 (Sheet 1) / 20-42-21 - Solder Sleeves - P/N Characteristics and Shrinking Tools E0160	



E0160-1-XX

SLEEVE	SHRINKING TOOLS					
	NORM	GENERATOR P/N	GUN P/N	GENERATOR INDICATIONS		
				HEAT TIME *	BREAK	CYCLE
1-0H	RAYCHEM	ED-7-001 OR ED-7-004	IR1759 MK31	24	–	–
		ED-7-005		60	01	04
1-1H		ED-7-001 OR ED-7-004		30	–	–
		ED-7-005		60	01	05
1-2H		ED-7-001 OR ED-7-004	IR3104 MK31	54	–	–
		ED-7-005		60	01	09
1-3H		ED-7-001 OR ED-7-004		72	–	–
		ED-7-005		60	01	12

* TENTHS OF A SECOND FOR ED-7-005
SECOND FOR ED-7-001 MK 31

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Figure 004 (Sheet 1) / 20-42-21 - Solder Sleeves - P/N Characteristics and Shrinking Tools E0160

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SCREEN BRAID GROUNDING SOLDER SLEEVES

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E0160-1-XX

WIRE TYPE	WIRE GAUGE 26	24	22	20	18	16	14	METHOD
SJ	–	1.0H	1.0H	1.0H	1.0H	1.0H	1.0H	"A" OR "B"
TK	1.0H	1.0H	1.0H	1.0H 1.1H	1.1H	1.1H	–	
UD	1.0H	1.0H	1.0H	1.1H	–	–	–	
ST	–	1.0H	1.0H	1.0H	1.0H	1.0H 1.1H	–	
TT	–	1.0H	1.0H	1.1H	1.1H	1.1H	–	
UE	–	1.0H	1.1H	1.1H	1.1H	–	–	
SW	–	1.0H	–	–	–	–	–	"E"
XM	=	1.0H OR 1.1H	=	=	=	=	=	"C"
WF	–	1.1H	–	–	–	–	–	
XE	–	–	–	–	1.0H	–	–	
YK	–	–	1.1H	1.1H	–	–	–	"E"
VR	–	–	–	–	1.2H	–	–	"B" OR "E"
* HD CF	–	1.1H	–	–	–	–	–	"C" OR "D" OR "E"
* HD RG	–	1.0H 1.1H	–	–	–	–	–	
HE	–	1.1H	–	–	–	–	–	
HG	1.3H							"F"
WC	1.2H AND 1.1H							"G"
** YF	1.3H							"F"
** HA	1.3H							"F"

* CF AND RG WIRE TYPES ARE INNER COMPONENTS OF HD WIRE TYPE

** HA AND YF SPECIAL WIRE TYPES ONLY FOR A300/600ST

S15 20 42 21 0 ACM0 06

R

Solder Sleeves - Installation Method Allocation Table
E0160
Figure 002

EFF : ALL

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Oct 01/01

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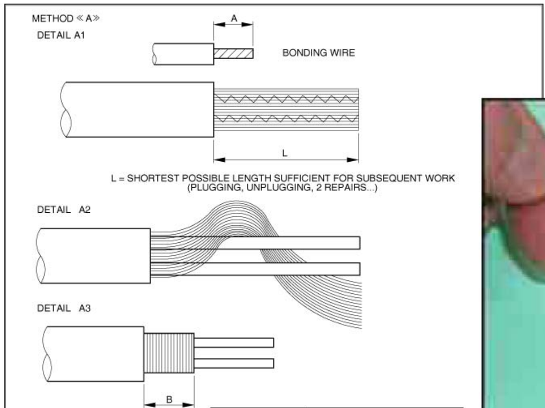
SCREEN BRAID GROUNDING SOLDER SLEEVES

X8U08481 - X0332T0 - XM202900000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 006 (Sheet 1) / 20-42-21 - Solder Sleeves - Method "A" : Stripping Characteristics E0160 and NSA937790



SLEEVE	WIRE STRIPPING LENGTH (mm)		
	L	A	B
E0160-1-0H E0160-1-1H	60 FOR FIRST CONNECTION	5.5	7
E0160-1-2H		6.5	8
E0160-1-3H		8	9.5
NSA937790-XX		6 TO 7	6 TO 7
ABS0237-01 ABS0237-02 ABS0237-03 ABS0237-04		5	4.5
ABS0237-05 ABS0237-06		7	6.5

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Figure 006 (Sheet 1) / 20-42-21 - Solder Sleeves - Method "A" : Stripping Characteristics E0160 and NSA937790

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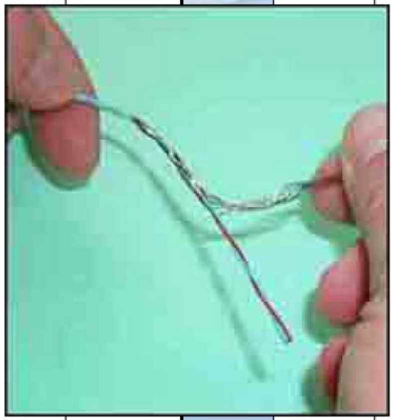

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 007 (Sheet 1) / 20-42-21 - Solder Sleeves - Method "A" : Installation E0160 and NSA937790

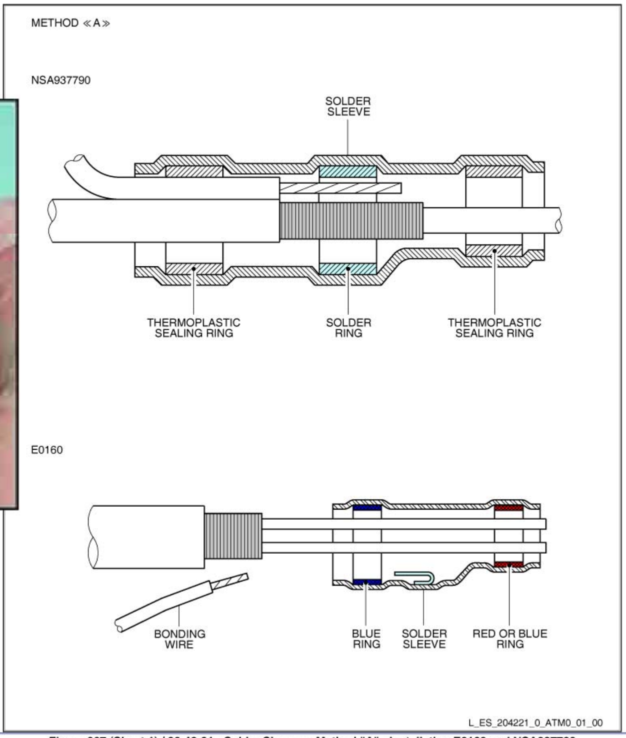

Figure 007 (Sheet 1) / 20-42-21 - Solder Sleeves - Method "A" : Installation E0160 and NSA937790

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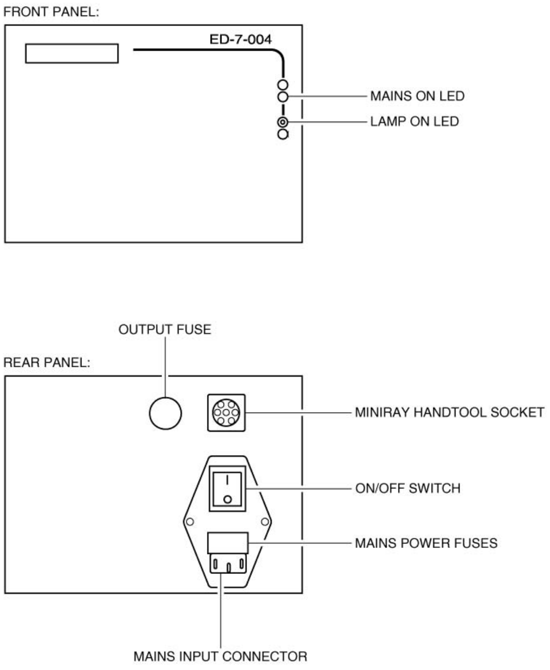
SCREEN BRAID GROUNDING SOLDER SLEEVES

X8U08481 - X0332T0 - XM202900000001

SCREEN BRAID GROUNDING SOLDER SLEEVES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-25-32 - Infrared Generators - Description ED-7-004	



L_ES_202532_0_AEM0_01_0

Figure 002 (Sheet 1) / 20-25-32 - Infrared Generators - Description ED-7-004

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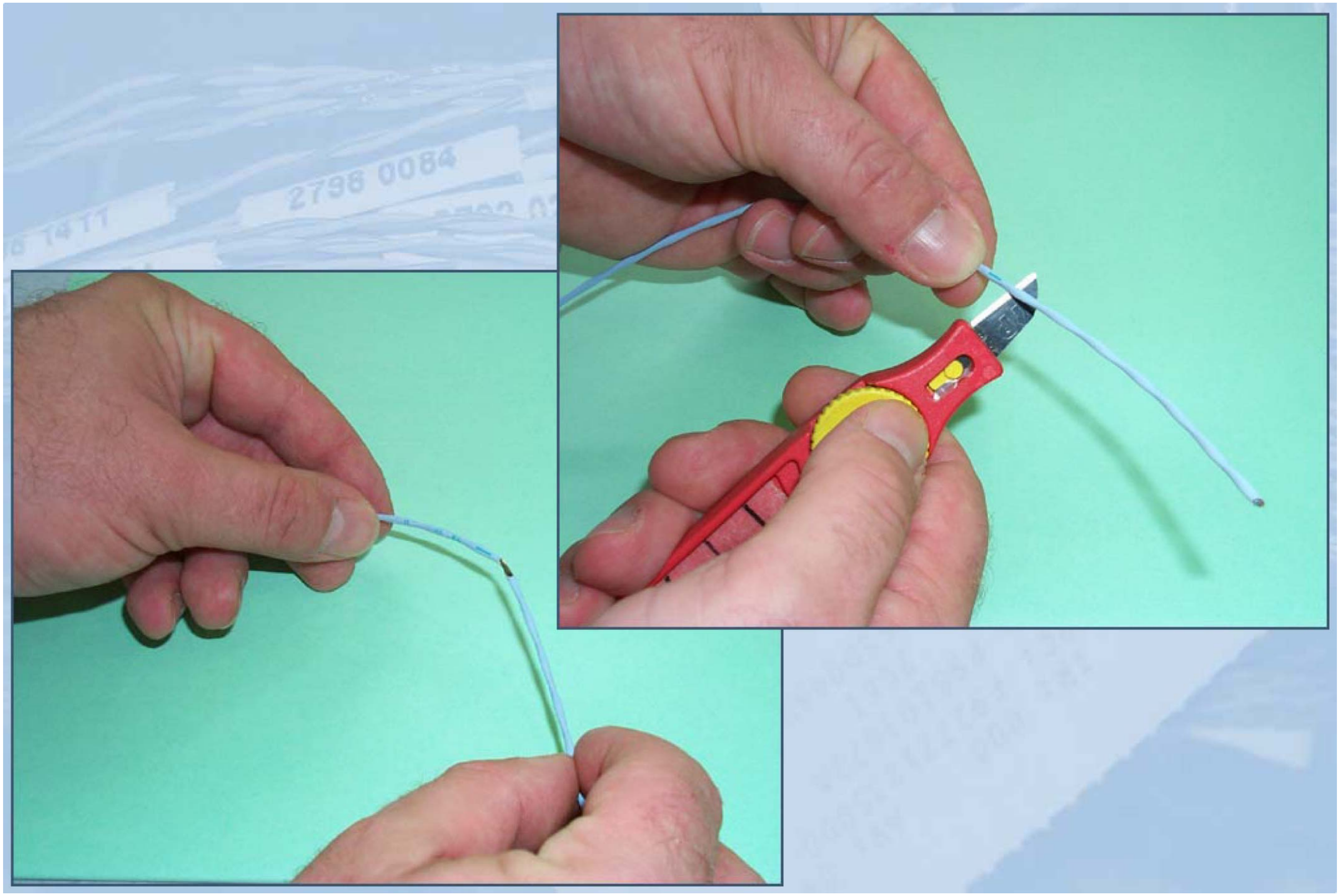
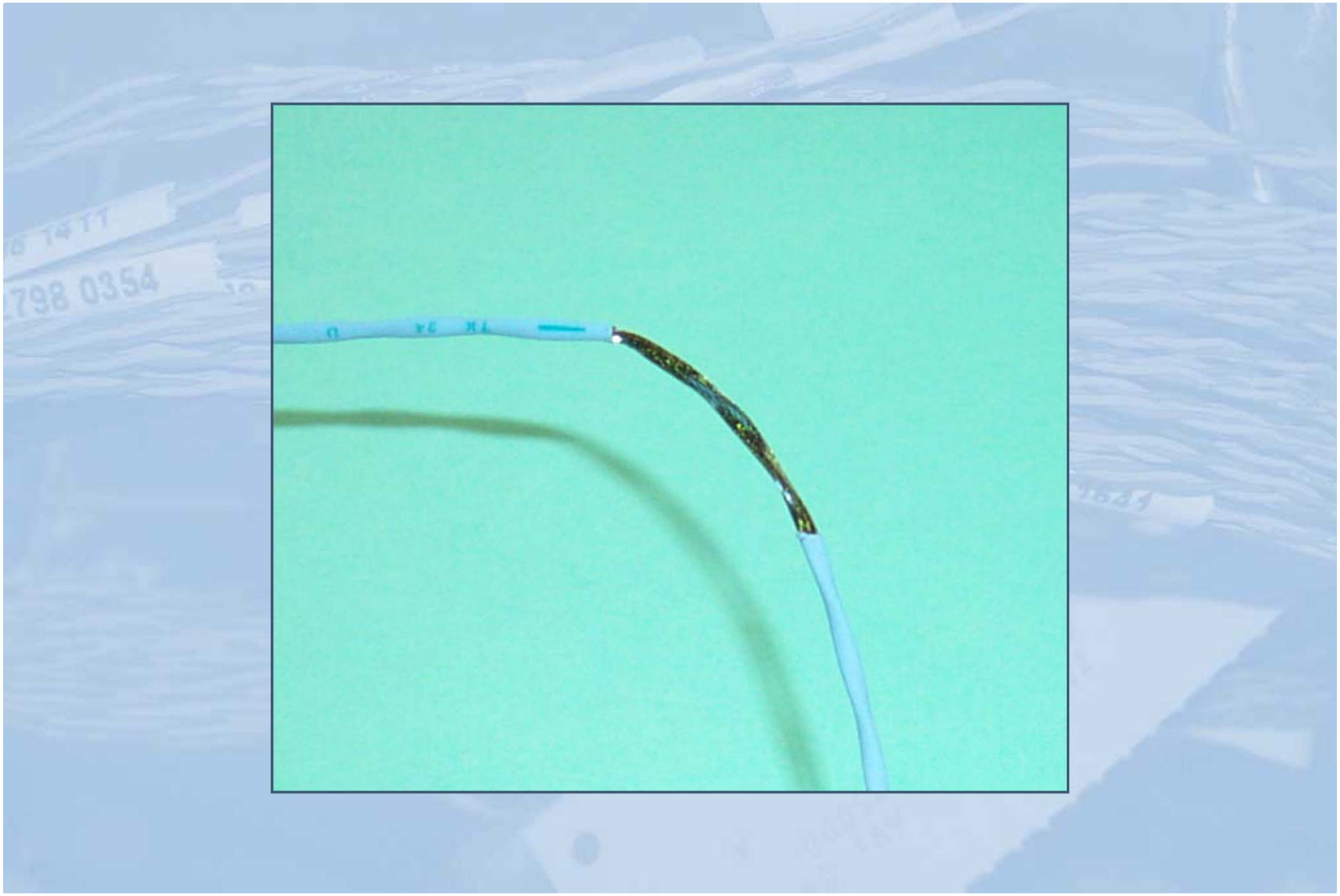
SCREEN BRAID GROUNDING SOLDER SLEEVES

X8U08481 - X0332T0 - XM2029000000001

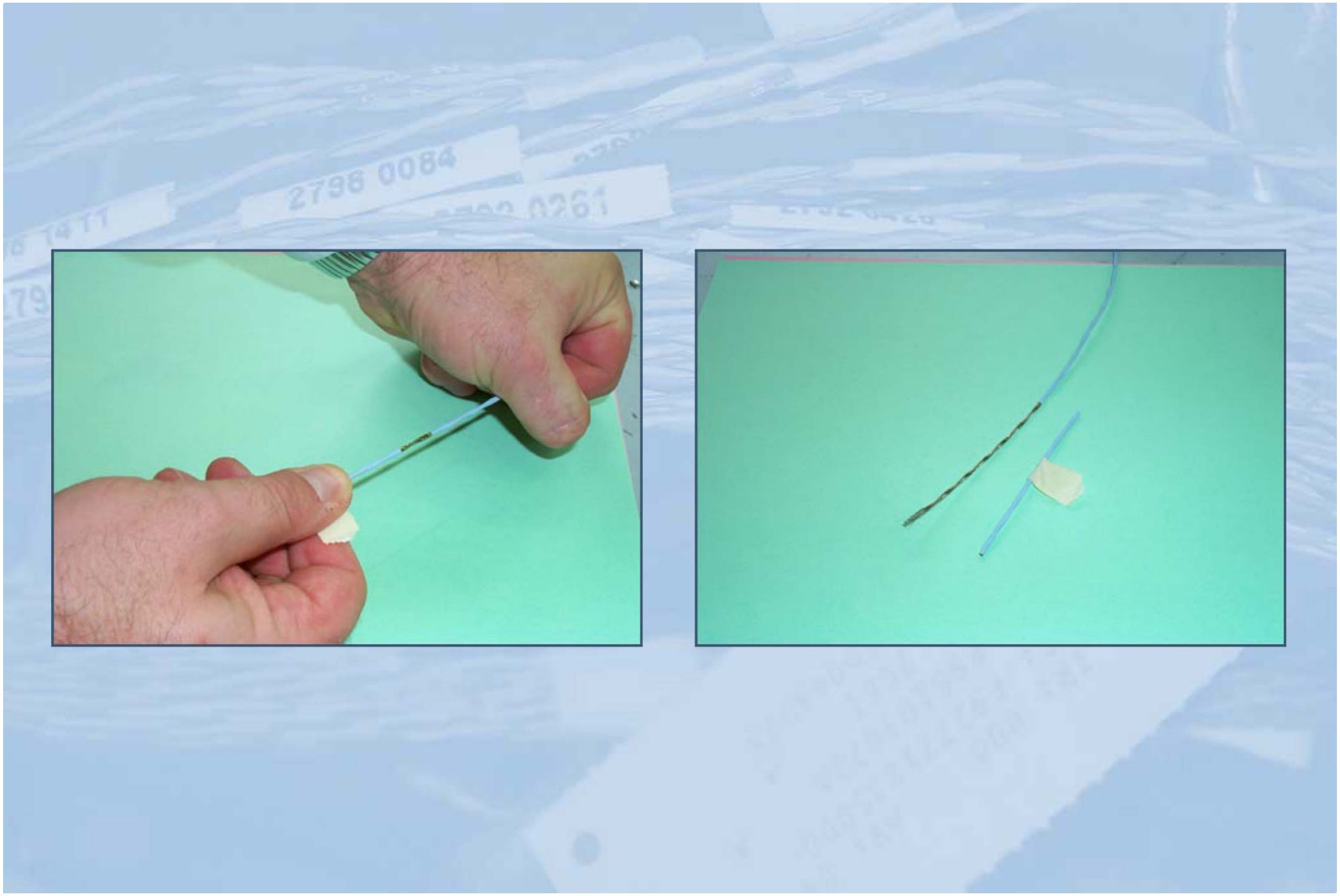


SCREEN BRAID GROUNDING SOLDER SLEEVES

X8U08481 - X0332T0 - XM2029000000001



SCREEN BRAID GROUNDING SOLDER SLEEVES



SCREEN BRAID GROUNDING SOLDER SLEEVES

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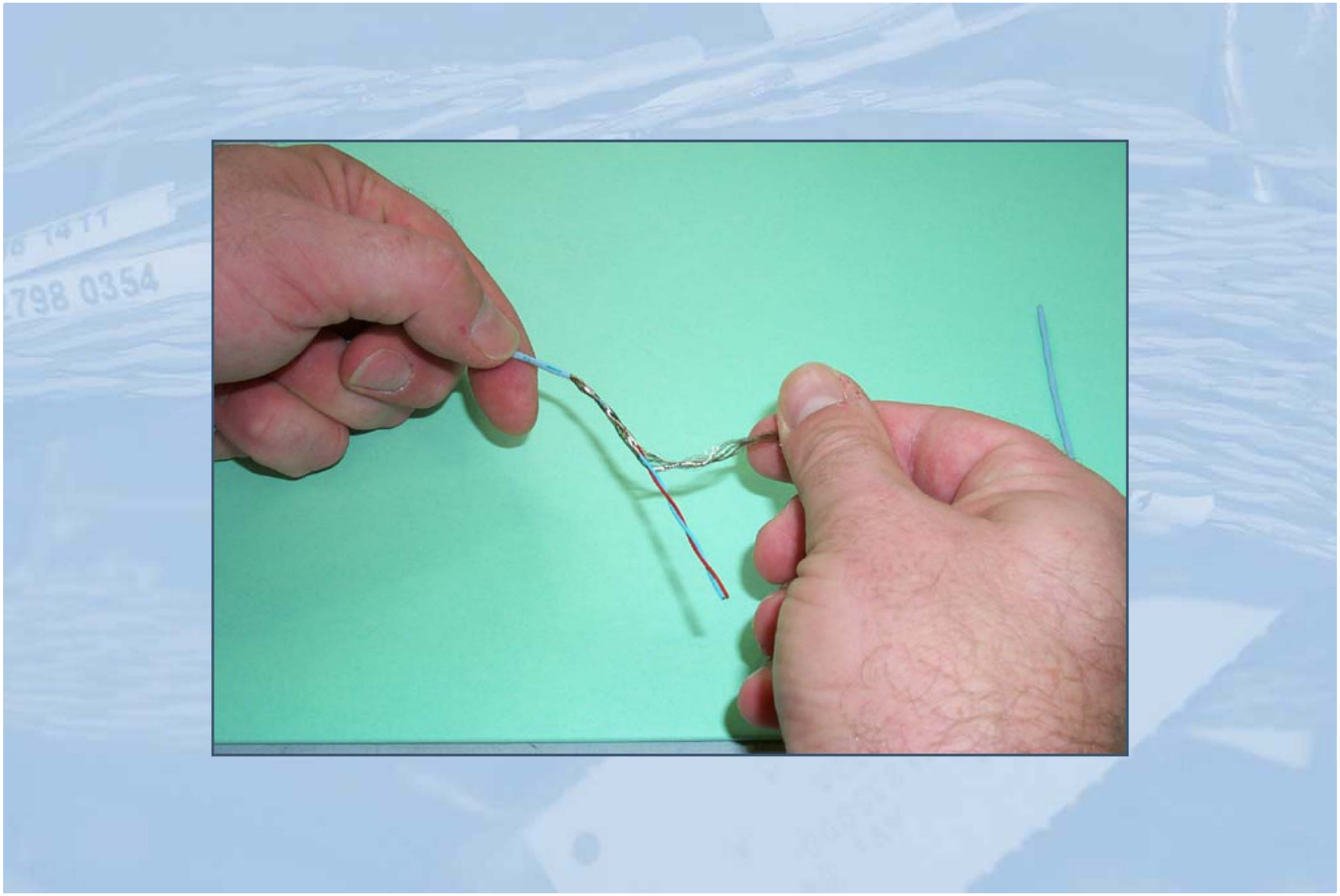
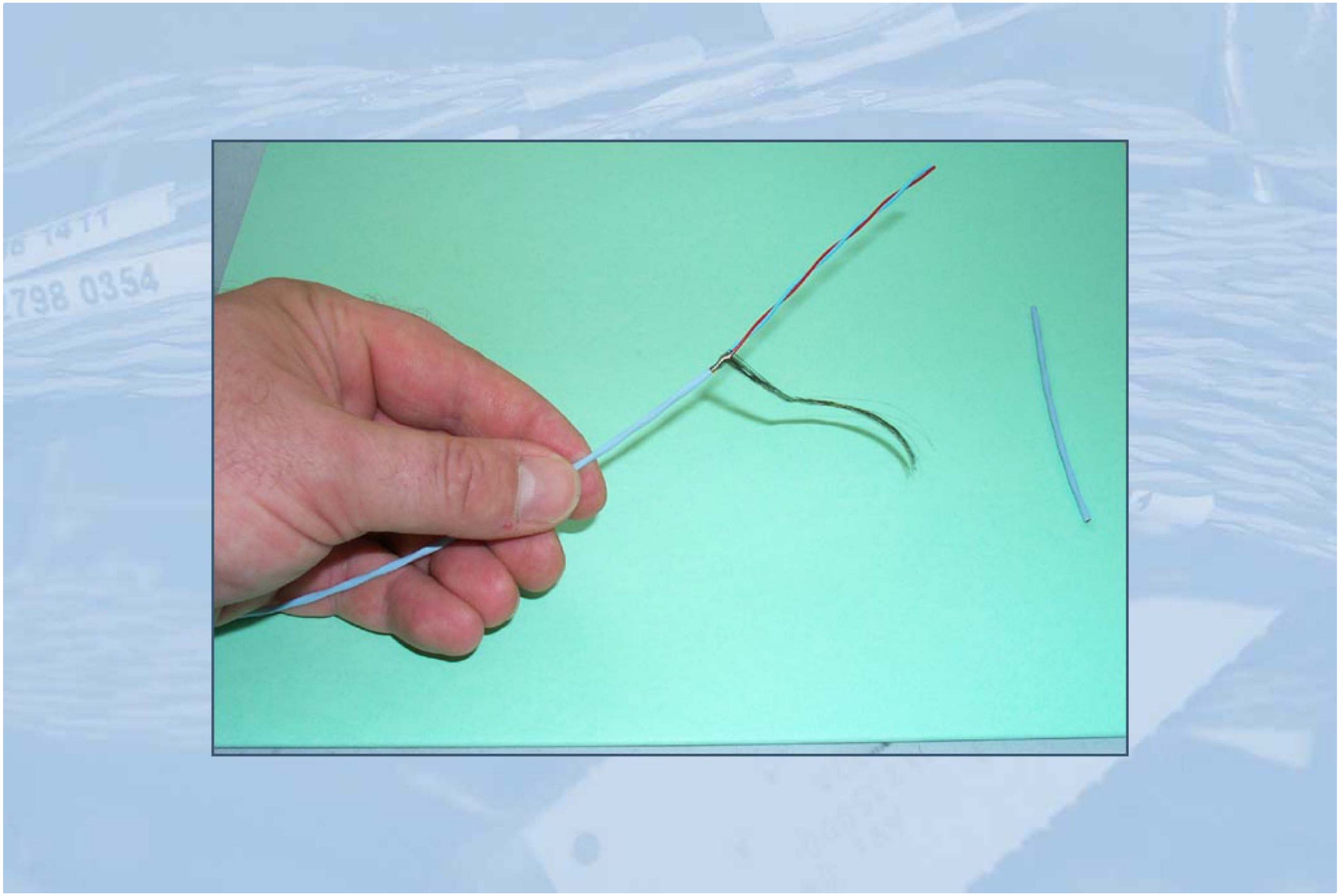
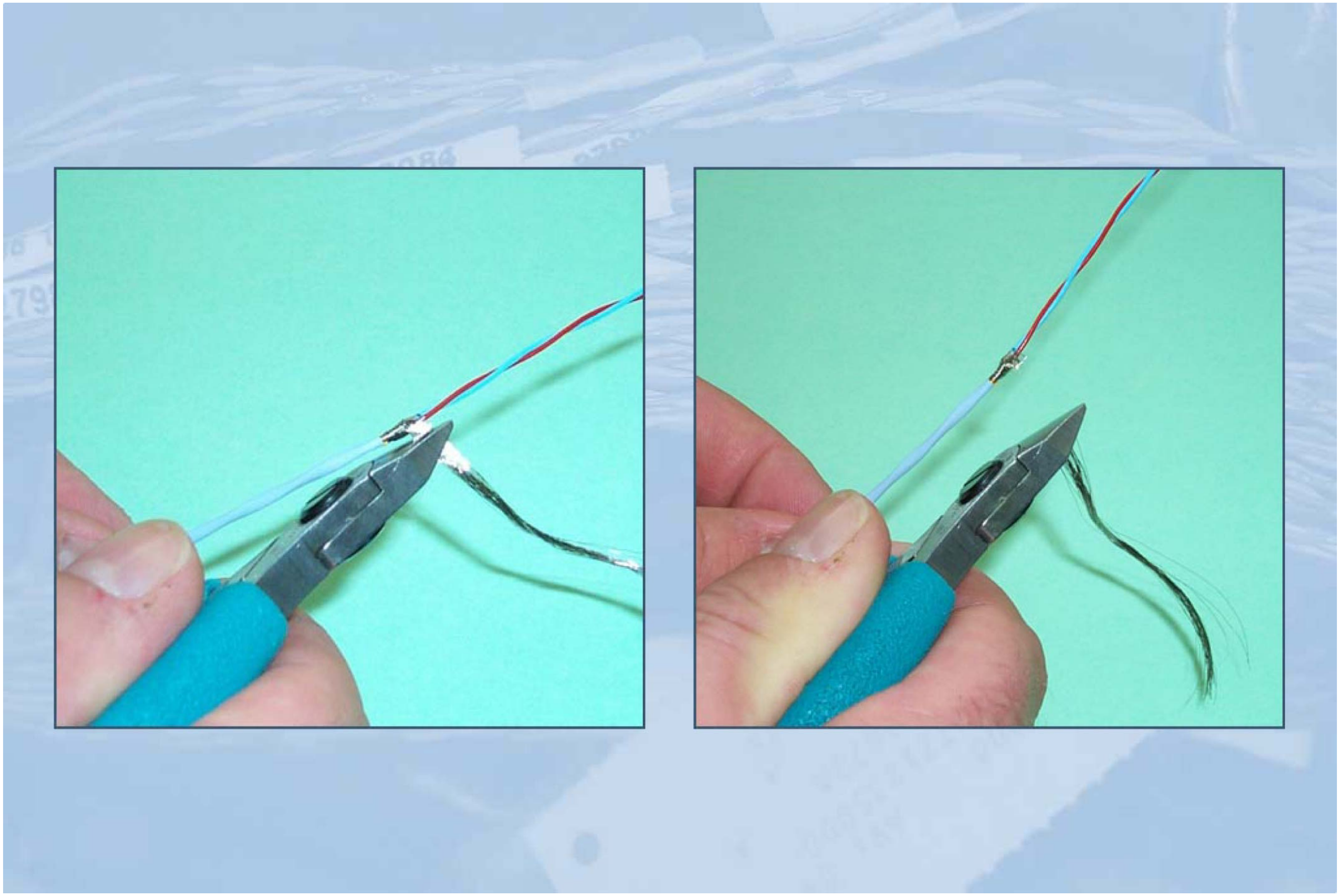


SCREEN BRAID GROUNDING SOLDER SLEEVES



SCREEN BRAID GROUNDING SOLDER SLEEVES



SCREEN BRAID GROUNDING SOLDER SLEEVES

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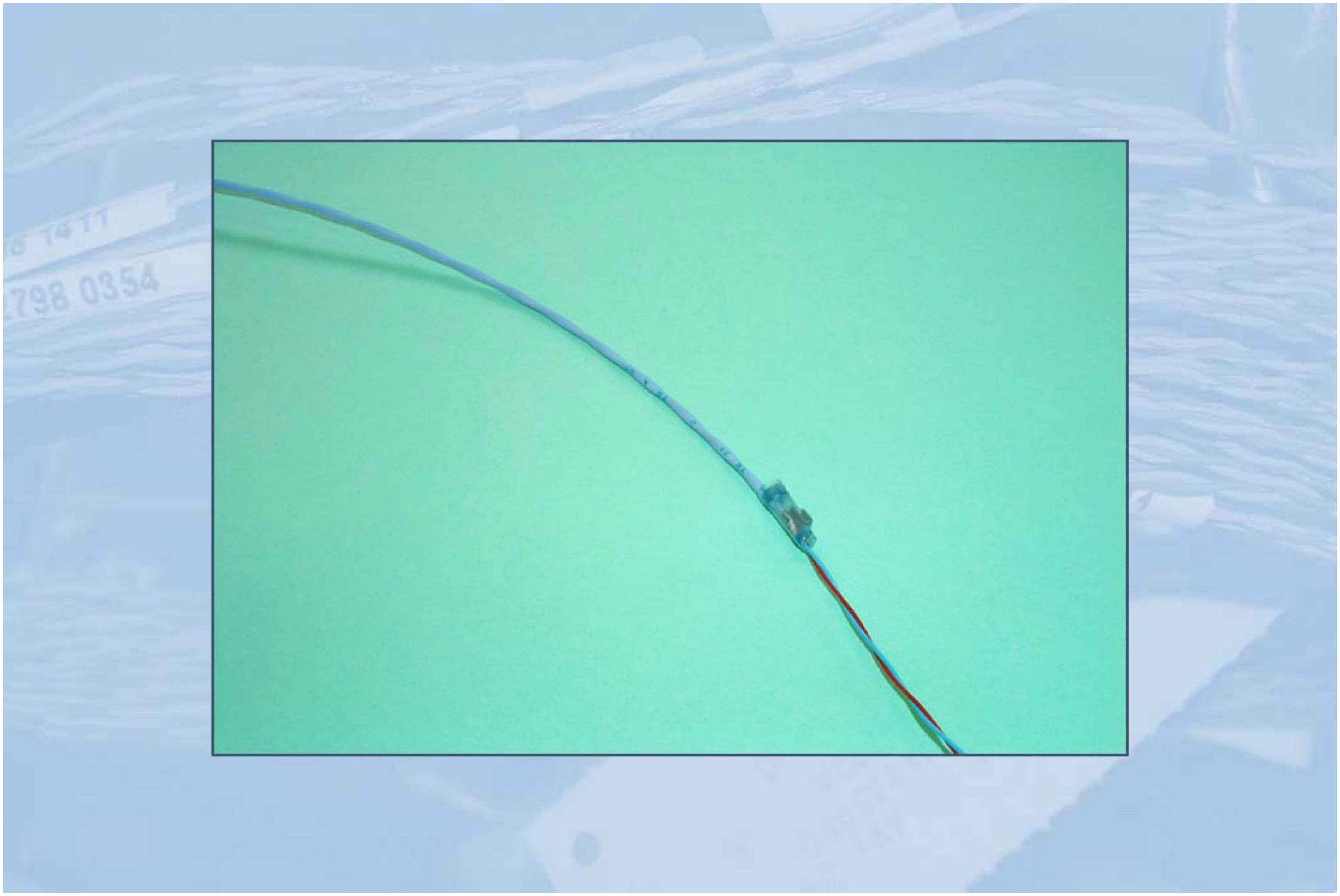
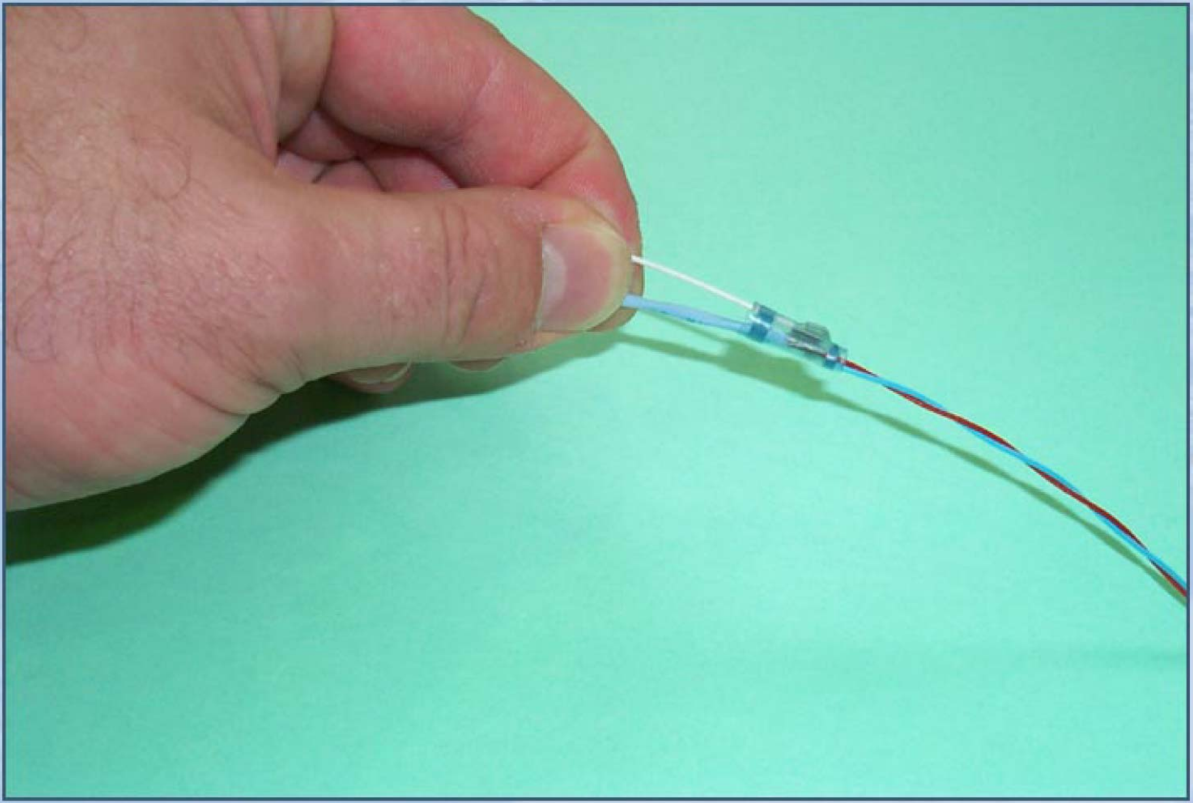


SCREEN BRAID GROUNDING SOLDER SLEEVES



SCREEN BRAID GROUNDING SOLDER SLEEVES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 006 (Sheet 1) / 20-25-32 - Infrared Generators - Operating Procedure	

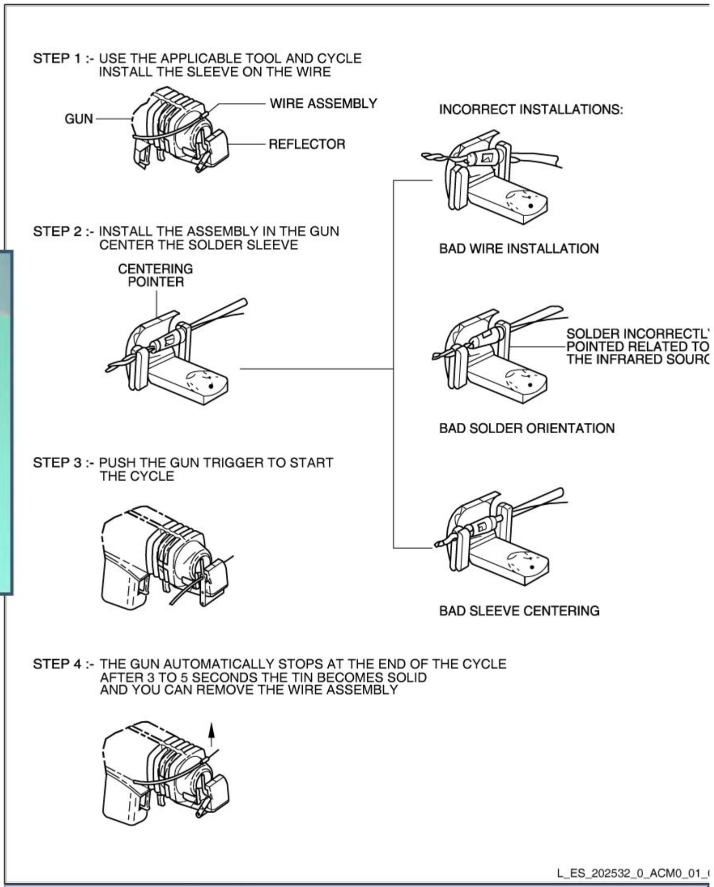


Figure 006 (Sheet 1) / 20-25-32 - Infrared Generators - Operating Procedure

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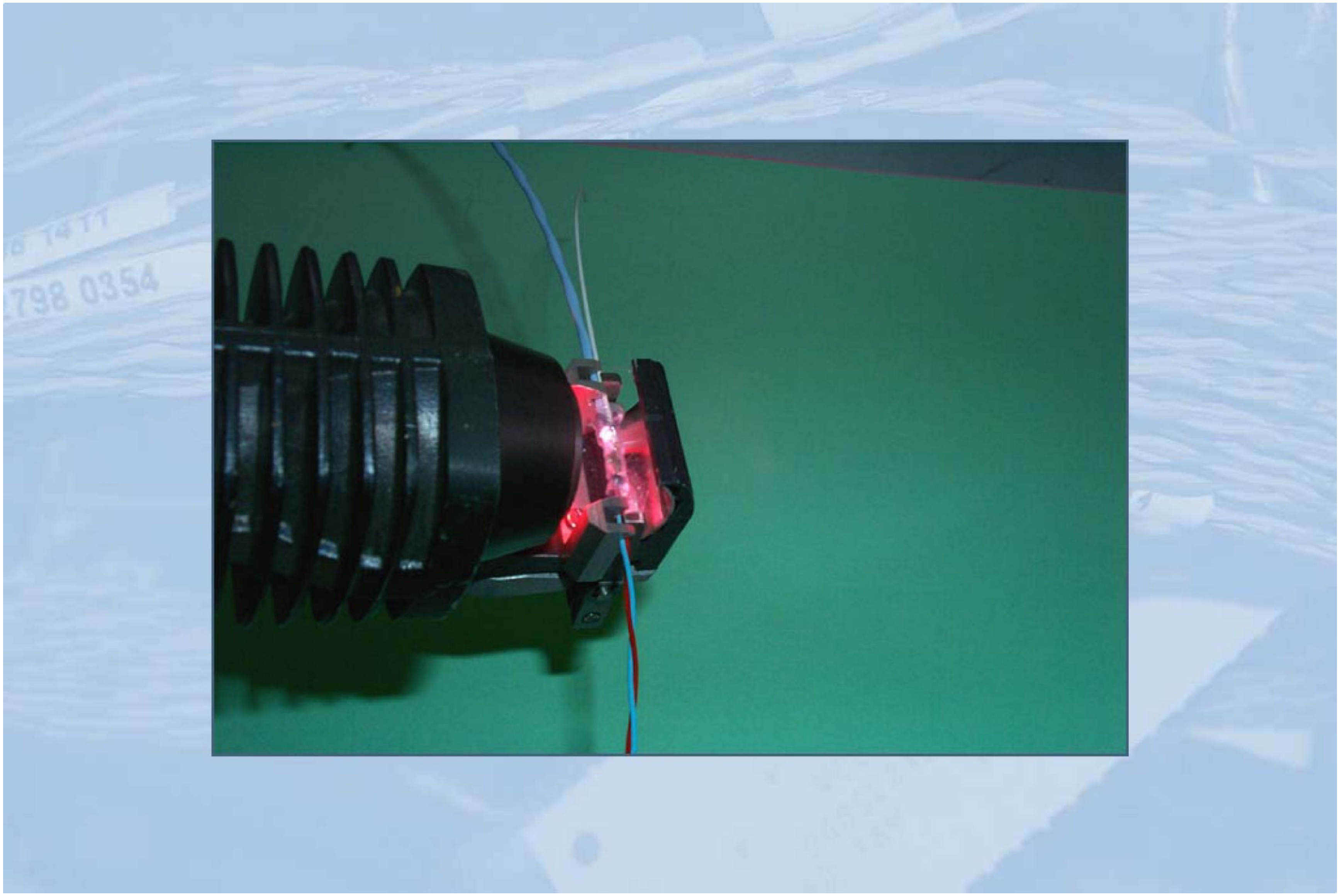
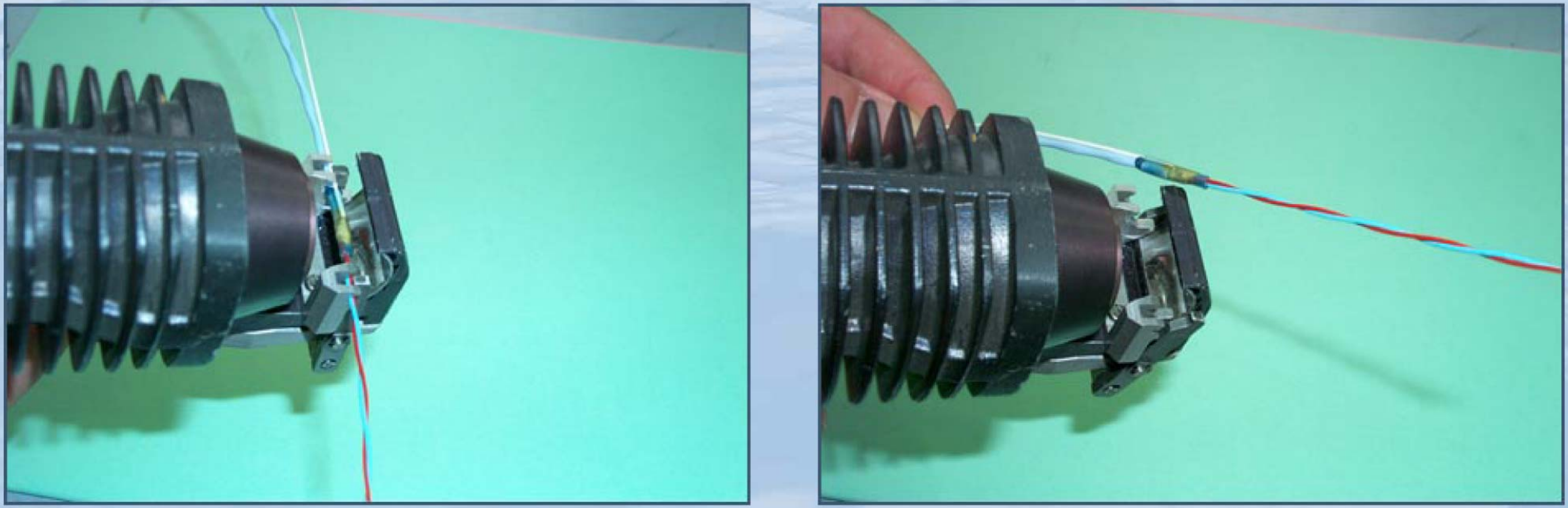
SCREEN BRAID GROUNDING SOLDER SLEEVES

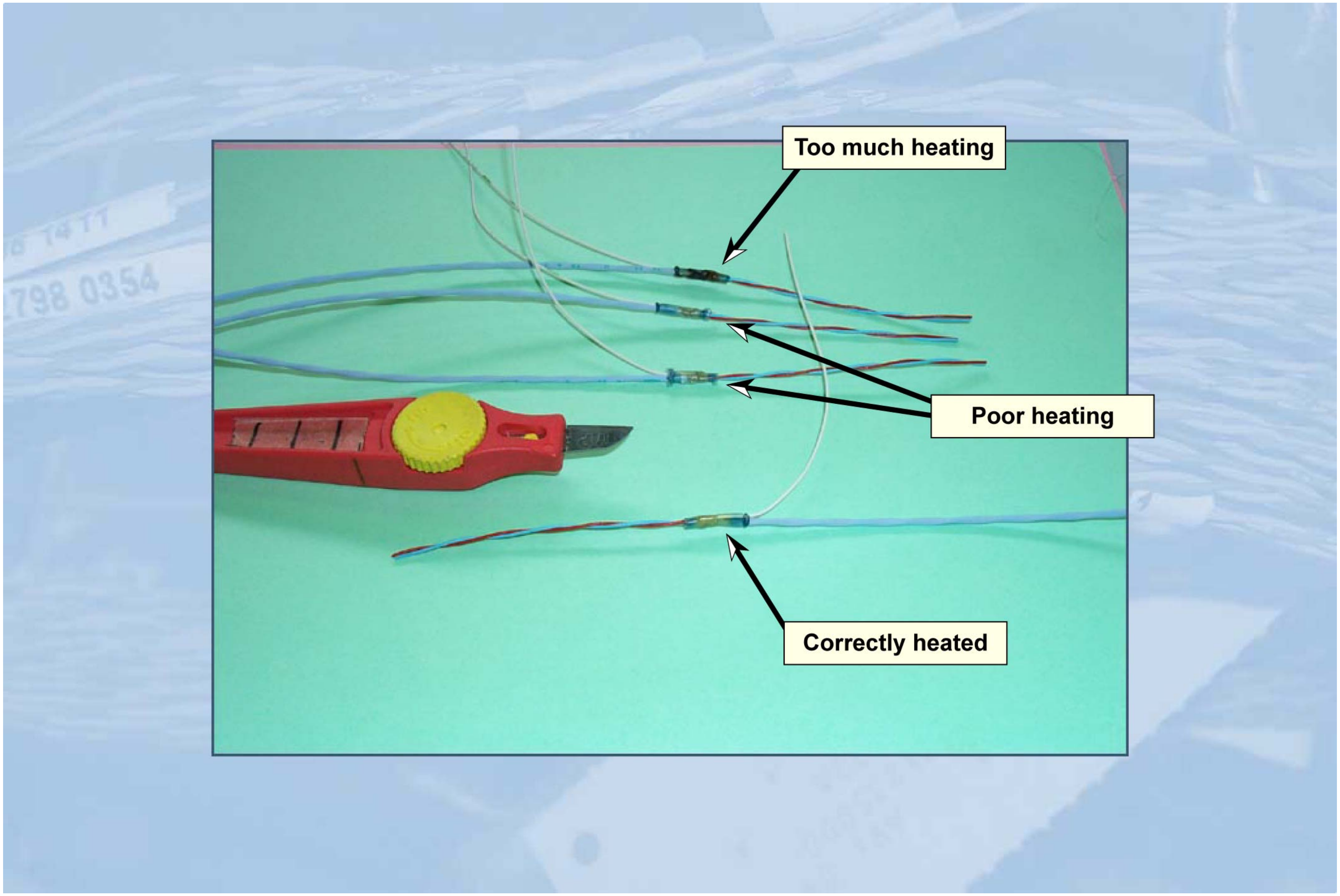
X8U08481 - X0332T0 - XM2029000000001



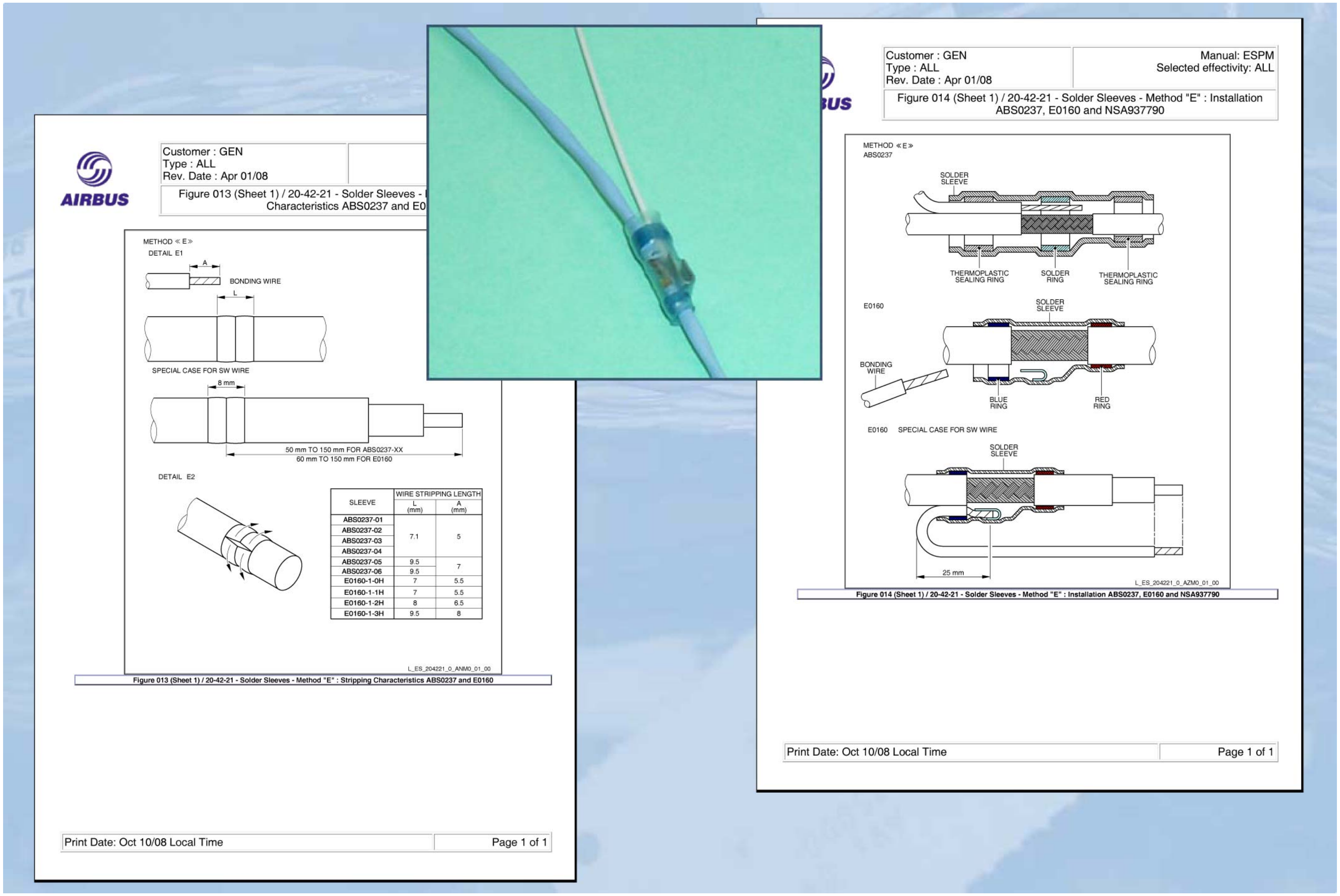
SCREEN BRAID GROUNDING SOLDER SLEEVES



SCREEN BRAID GROUNDING SOLDER SLEEVES



SCREEN BRAID GROUNDING SOLDER SLEEVES



SLEEVE	WIRE STRIPPING LENGTH	
	L (mm)	A (mm)
ABS0237-01	7.1	5
ABS0237-02		
ABS0237-03		
ABS0237-04		
ABS0237-05	9.5	7
ABS0237-06	9.5	
E0160-1-0H	7	5.5
E0160-1-1H	7	5.5
E0160-1-2H	8	6.5
E0160-1-3H	9.5	8

SCREEN BRAID GROUNDING SOLDER SLEEVES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 017 (Sheet 1) / 20-42-21 - Solder Sleeves - Method "G" : Stripping Characteristics and Installation E0160

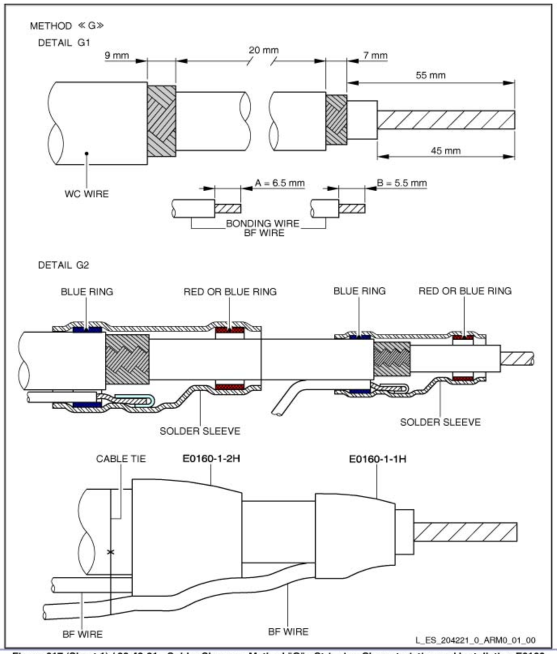


Figure 017 (Sheet 1) / 20-42-21 - Solder Sleeves - Method "G" : Stripping Characteristics and Installation E0160

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SCREEN BRAID GROUNDING SOLDER SLEEVES

X8U08481 - X0332T0 - XM2029000000001

SCREEN BRAID GROUNDING SOLDER SLEEVES

UNUSED WIRES

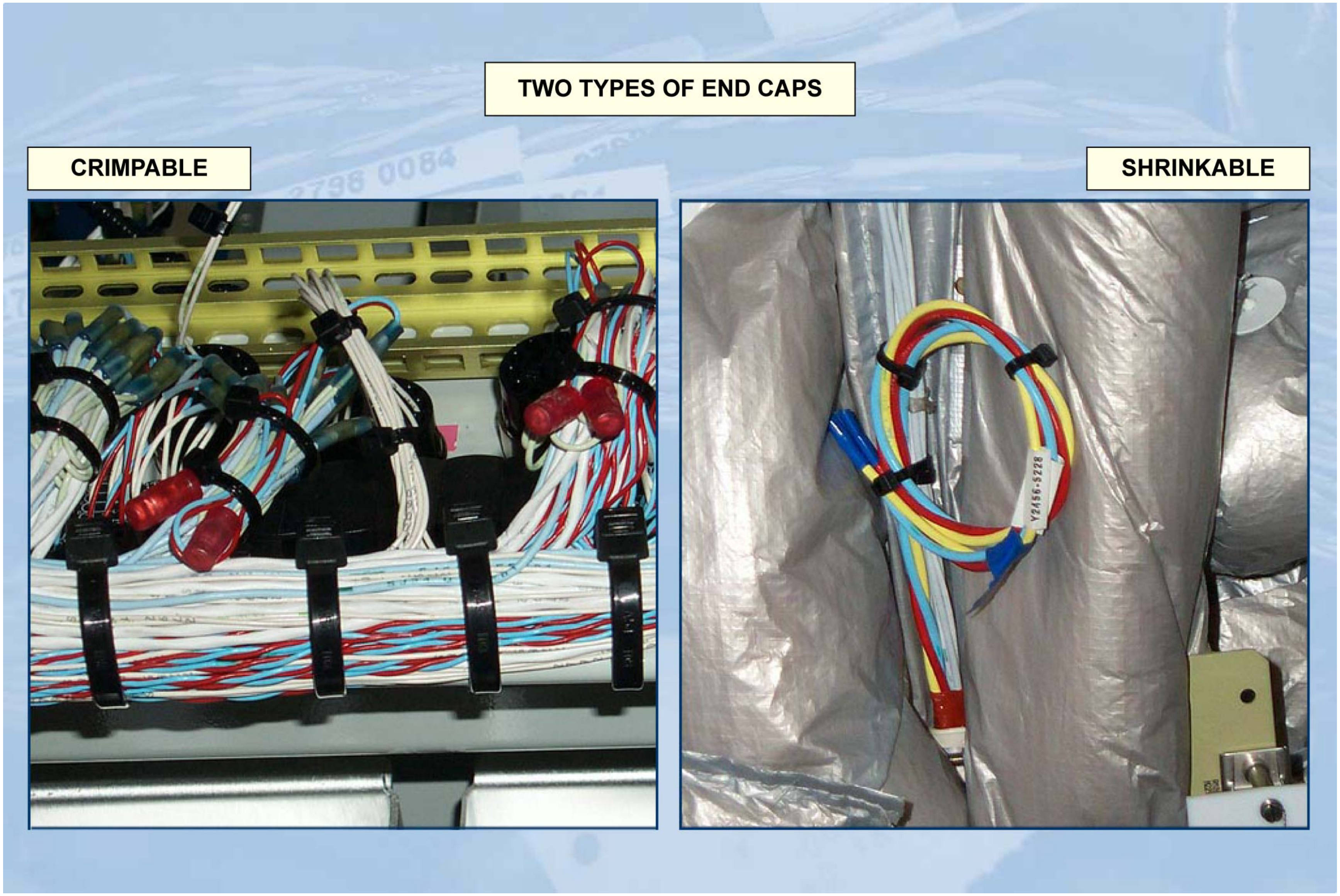
TERMINATION - END CAPS

How to install the end cap for non-connected wires.
Two types of end caps
- Crimpable
- Shrinkable

Crimpable end cap
- Low temperature - NSA 936604
- High temperature - NSA 936601

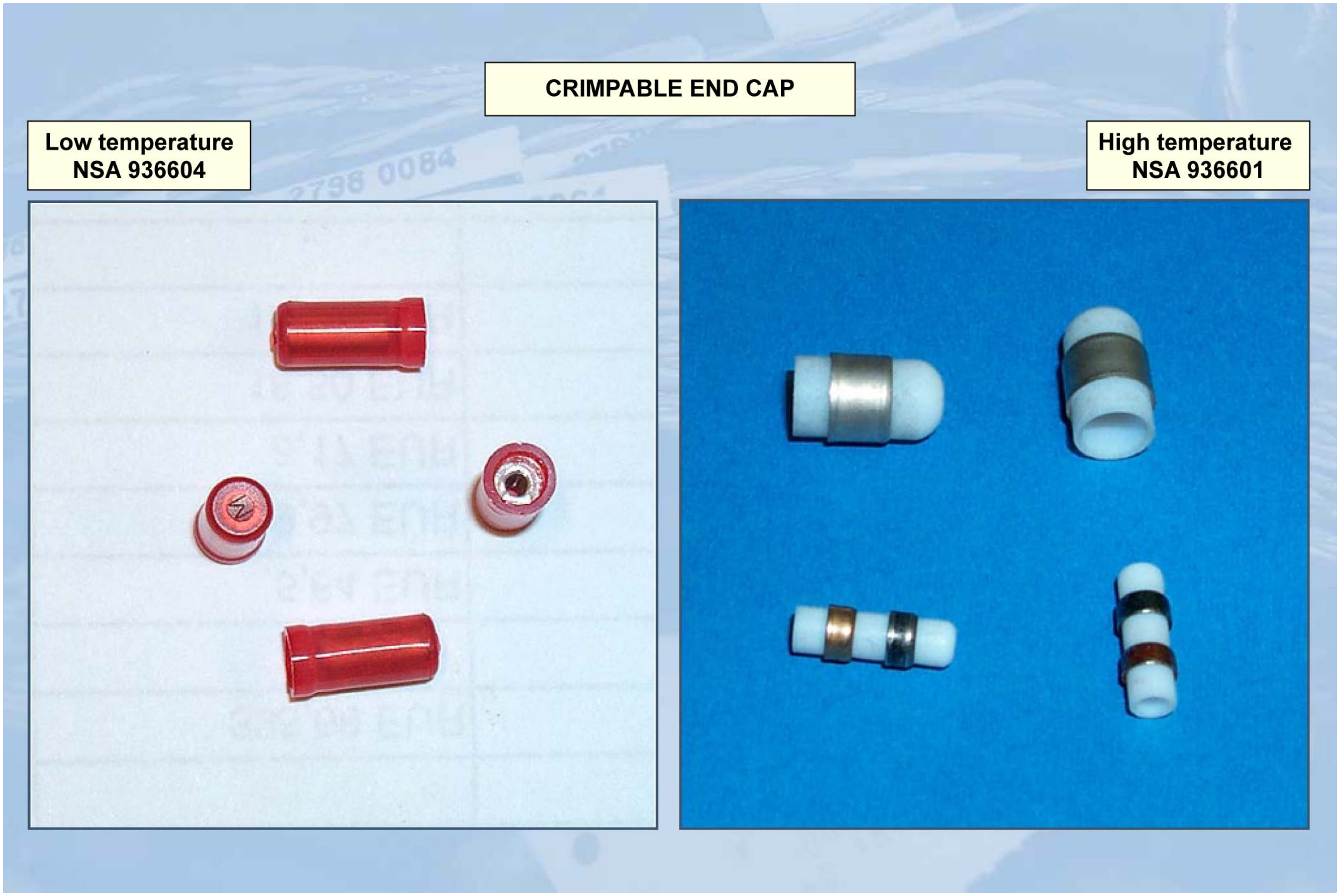
This table gives the different sizes and the tool to use for the NSA 936 601.
This table gives the end caps to use depending on the wire type and gauge.
Shrinkable end caps. NSA 936 603.
Shrinking end cap table.

TERMINATION - END CAPS



TERMINATION - END CAPS

X8U08481 - X0332T0 - XM2030000000001

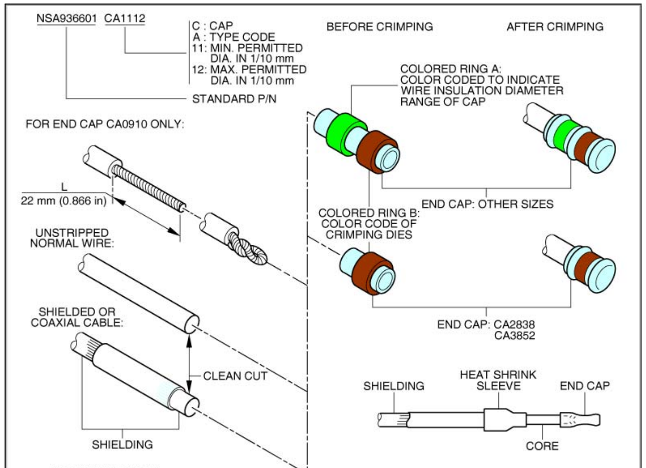


TERMINATION - END CAPS

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-42-13 - End Caps - P/N Characteristics and Crimping Tools NSA936601



NSA936601CAXXXX

END CAP	PERMITTED WIRE DIAMETER (mm)		COLORED RING		HAND CRIMPING TOOL		
	MIN.	MAX.	A	B	NORM	P/N	DIE COLOR
CA0910	0.91	1.10	RED	GREEN	AMP	69272-1	GREEN
CA1112	1.12	1.29	BLUE	GREEN	AMP	69272-1	GREEN
CA1314	1.32	1.42	YELLOW	GREEN	AMP	69272-1	GREEN
CA1416	1.42	1.63	BROWN	GREEN	AMP	69272-1	GREEN
CA1618	1.65	1.88	VIOLET	GREEN	AMP	69272-1	GREEN
CA1922	1.90	2.21	BLACK	ORANGE	AMP	69272-1	ORANGE
CA2227	2.23	2.79	GREY	ORANGE	AMP	69272-1	ORANGE
CA3135	3.17	3.50	NICKEL	NICKEL	AMP	69272-1	WHITE
CA2838 *	2.82	3.81	–	BROWN	AMP	69260-1	BROWN
CA3852 *	3.83	5.21	–	NATURAL	AMP	69260-1	NATURAL

* ONE RING ONLY (RING B)

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Figure 001 (Sheet 1) / 20-42-13 - End Caps - P/N Characteristics and Crimping Tools NSA936601

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TERMINATION - END CAPS

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-42-13 - End Cap - Allocation Table NSA936601

NSA936601CAXXXX

WIRE TYPE	WIRE GAUGE									
	26	24	22	20	18	16	14	12	10	8
AK AKB PD QD RD	-	CA0910	CA1112	CA1314	CA1618	CA1618	CA1922	CA2227	CA3135	-
BE	-	CA1112	CA1314	CA1416	CA1618	-	-	-	-	-
DE PE QE RE	-	CA1314	CA1416	CA1618	CA1922	CA2227	CA2838	CA2838	CA2838	CA3852
DG	-	-	-	-	-	-	-	-	CA3852	-
SE	-	CA1618	CA1618	CA1922	CA2227	CA2227	-	-	-	-
SF SFB	-	CA1922	CA1922	CA2227	CA2227	CA2227	-	-	-	-
SG	-	CA1618	-	-	-	-	-	-	-	-
TG UG	-	CA1314	CA1416	CA1618	CA1922	CA2227	-	-	-	-
ST	-	CA1416	CA1416	CA1618	CA1922	CA2227	-	-	-	-
TT UE	CA2227	CA2227	CA2838	CA2838	CA3852	CA3852	-	-	-	-
DK QG PG RH	CA0910	CA0910	CA1112	CA1314	CA1618	CA1922	CA2227	CA2227	CA2838	CA3852
TJ TJB UK UKB	-	CA1112	CA1112	CA1314	CA1618	CA1618	-	-	-	-
ZVF	-	CA0910	-	-	-	-	-	-	-	-
DR DRB DRC DRD MLA MLB MLC MLD	-	-	-	-	-	CA1922	-	-	-	-

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Figure 002 (Sheet 1) / 20-42-13 - End Cap - Allocation Table NSA936601

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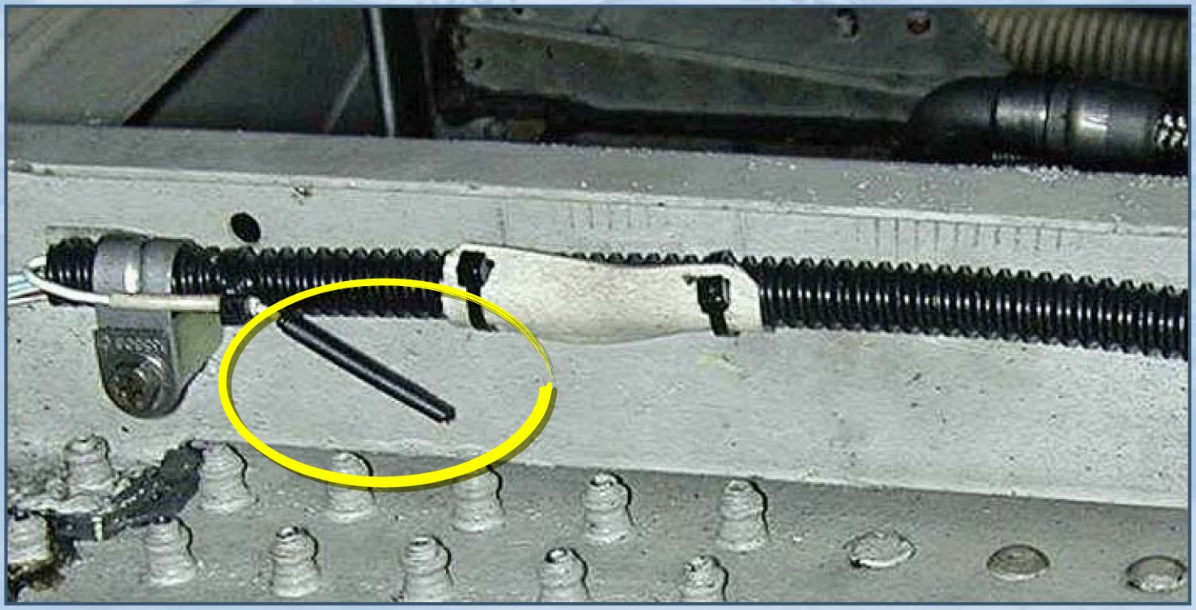
TERMINATION - END CAPS



TERMINATION - END CAPS

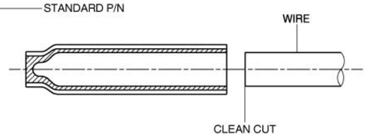
Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 006 (Sheet 1) / 20-42-13 - End Caps - P/N Characteristics and Shrinking Tools NSA936603

NSA936603 - C C 01 00

- 00 MAX. PERMISSIBLE DIA. IN 1/10mm
- 01 : MIN. PERMISSIBLE DIA. IN 1/10mm
- C : TYPE
- C : CAP
- STANDARD P/N



NSA936603CCXXXX

END CAP	END CAP COLOR	END CAP INTERNAL DIAMETER (mm)		SHRINKING TOOL		
		BEFORE SHRINKING MIN	AFTER SHRINKING MAX	NORM	P/N	HEAD P/N
CC0100	BLACK	3.2	0.6	RAYCHEM	695-01-A4-433 OR CV1981-42V-960W	PR13
CC0200		4.8	1.5			PR13
CC0300		6.4	2			PR12
CC0400		9.5	2.3			PR12

NSA936603CC0XXX

WIRE TYPE	WIRE GAUGE							
	24	22	20	18	16	14	12	10
AK	100	100	100	100	200	200	200	-
SF	100	100	100	100	200	200	200	-
TJ	100	100	100	100	200	200	200	-
UK	100	100	100	100	200	200	200	-
DE	100	100	100	100	200	200	200	-
SE	100	100	100	100	200	200	200	-
TG	100	100	100	100	200	200	200	-
UG	100	100	100	100	200	200	200	-
DG	-	-	-	-	-	-	300	300

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Figure 006 (Sheet 1) / 20-42-13 - End Caps - P/N Characteristics and Shrinking Tools NSA936603

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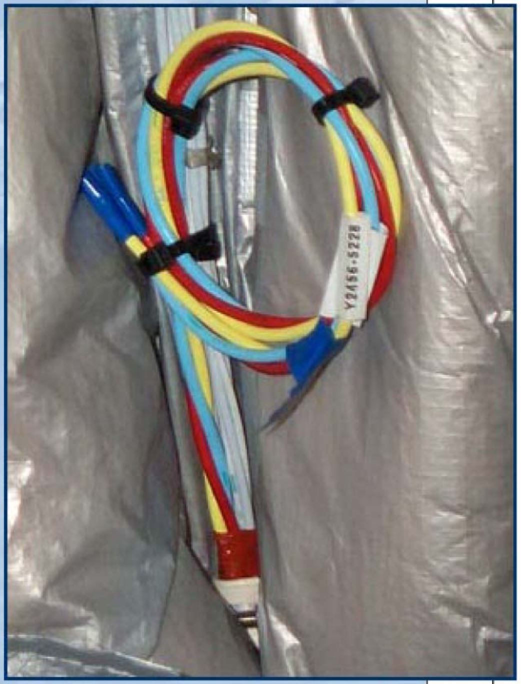
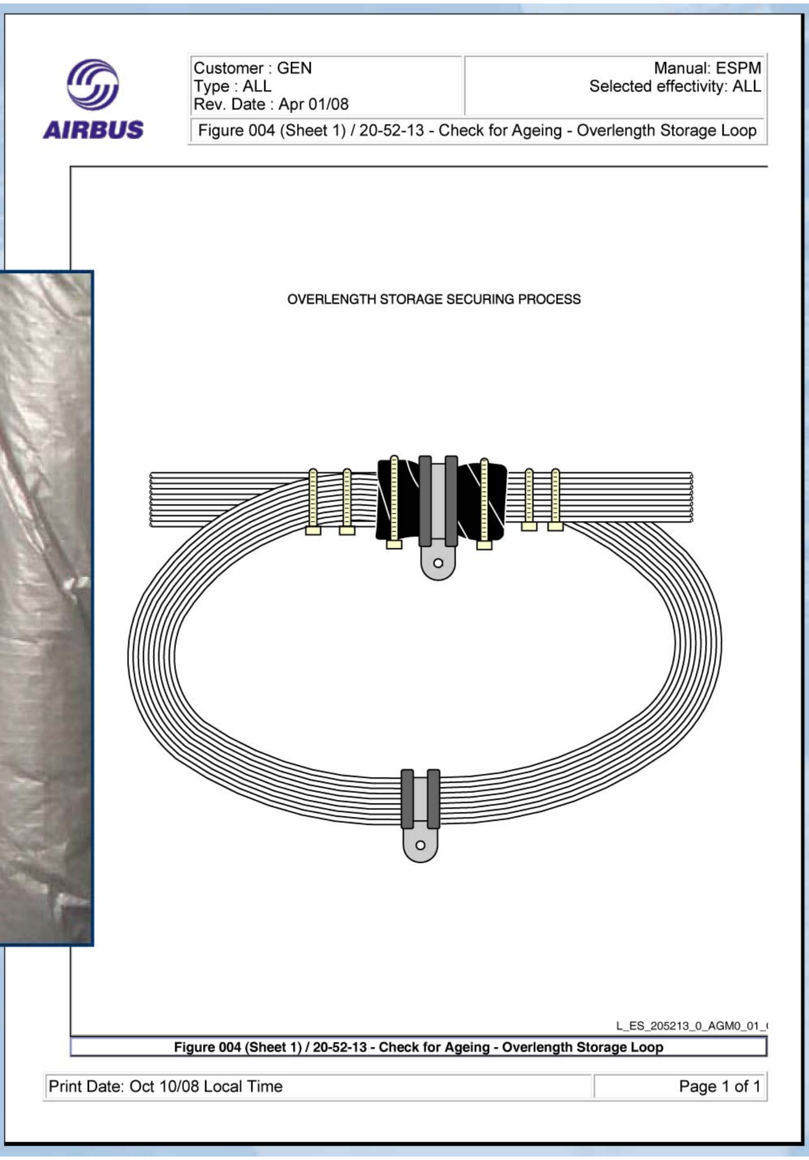
TERMINATION - END CAPS

UNUSED WIRES

STORAGE AND ATTACHEMENT

The storage of over length is made as shown in order to secure the wire to the adjacent structure.





Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 004 (Sheet 1) / 20-52-13 - Check for Ageing - Overlength Storage Loop	

Figure 004 (Sheet 1) / 20-52-13 - Check for Ageing - Overlength Storage Loop

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STORAGE AND ATTACHEMENT

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STORAGE AND ATTACHEMENT

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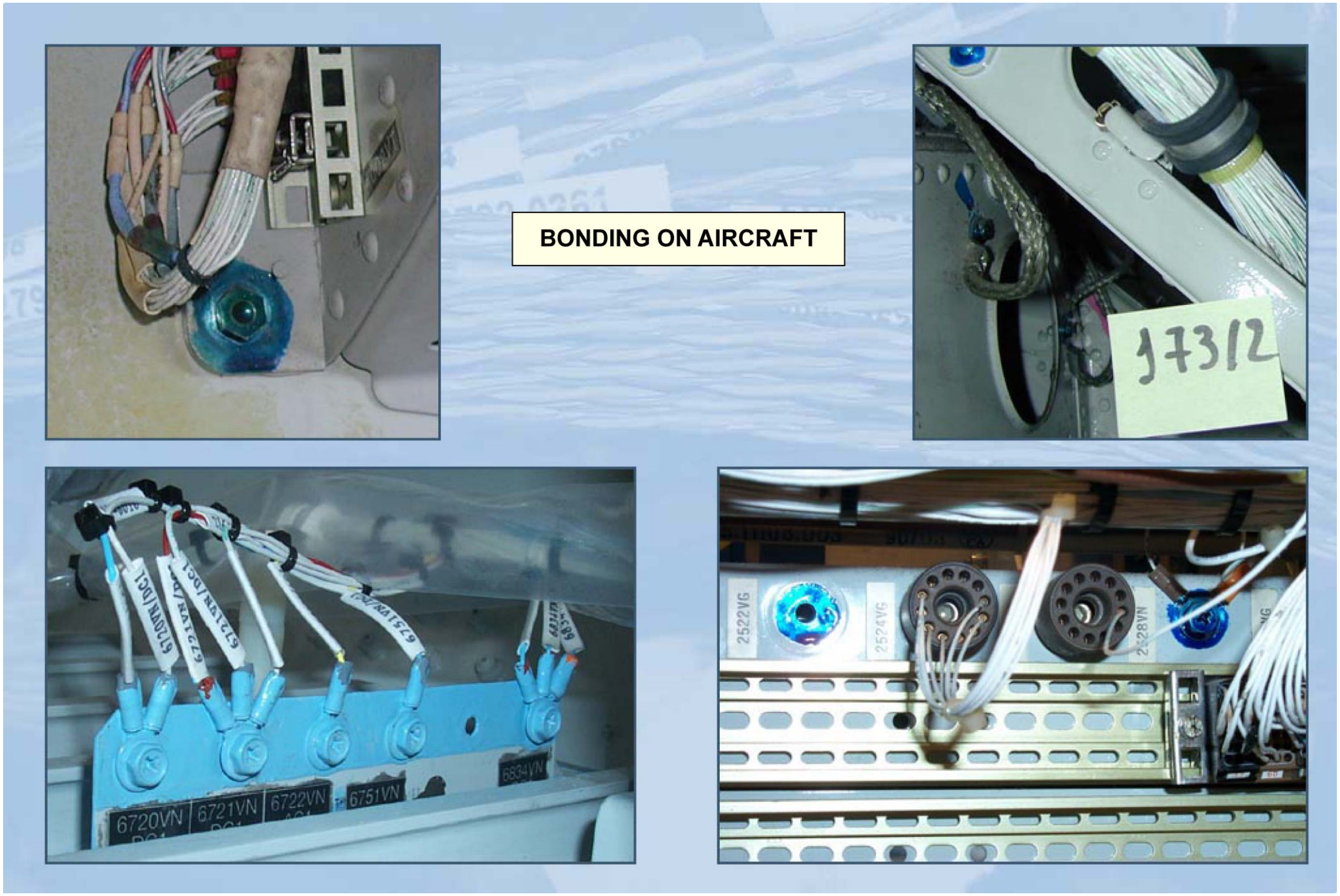
ELECTRICAL BONDING AND GROUNDS

PRIMARY BONDING

Bonding on aircraft
Bonding and grounding on aircraft.
Example of bonding by contact of electrical item on structure.
Example of bonding by contact of attachment item on structure.
Some other examples.



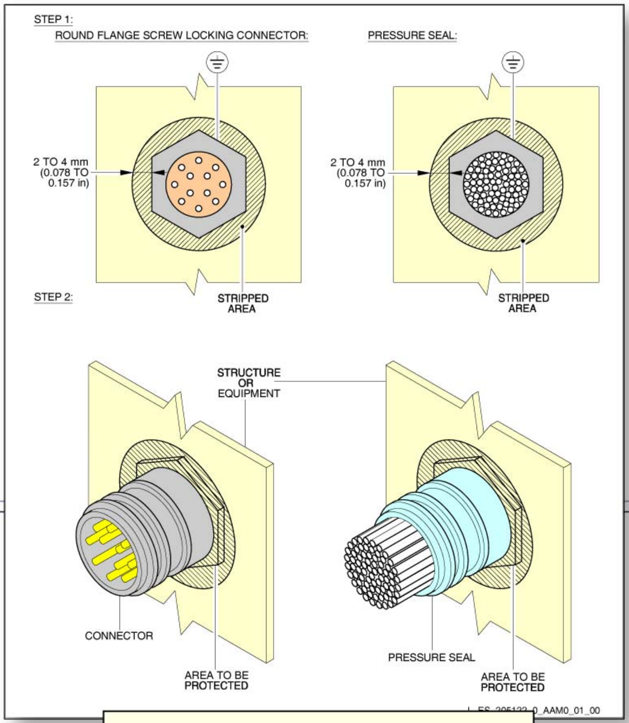
PRIMARY BONDING

BONDING OF THE ELECTRICAL ITEM DIRECTLY WITH STRUCTURE

BONDING BY SCREW THROUGH CONDUCTIVE FLEMENT

PRIMARY BONDING

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-51-22 - Bonding by Contact of Electrical Item on Structure - Installation Procedure Circular Connector or Pressure Seal	



CIRCULAR CONNECTOR

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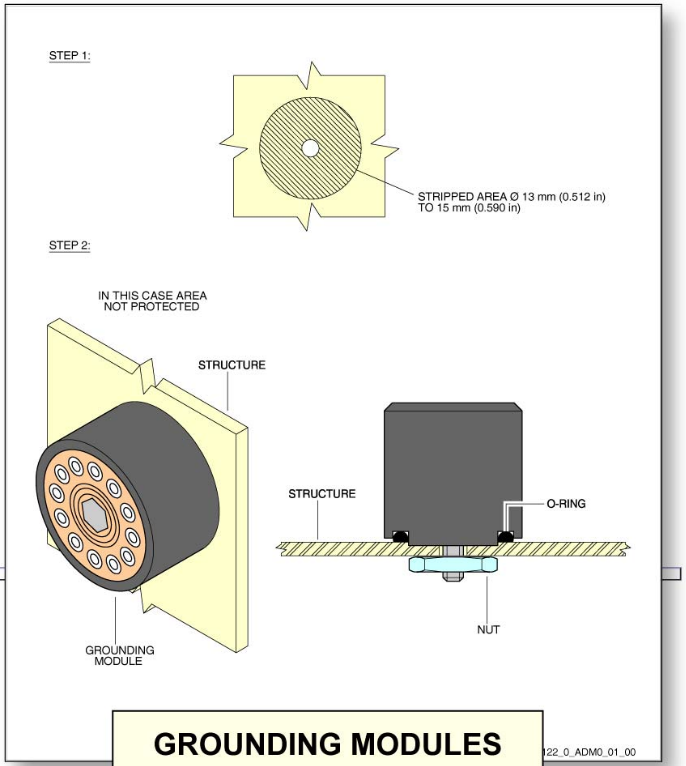
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-51-22 - Bonding by Contact of Electrical Item on Structure - Installation Procedure Grounding Module	



GROUNDING MODULES

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PRIMARY BONDING

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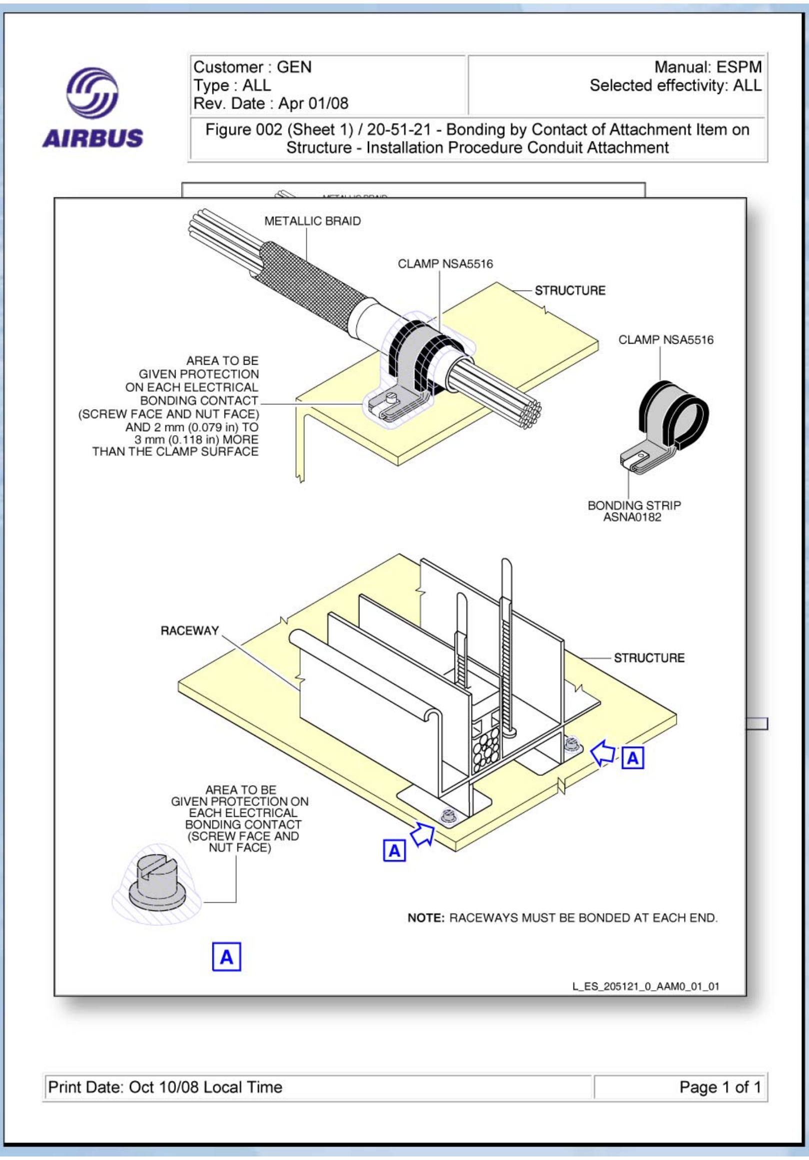

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Figure 002 (Sheet 1) / 20-51-21 - Bonding by Contact of Attachment Item on Structure - Installation Procedure Conduit Attachment

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PRIMARY BONDING

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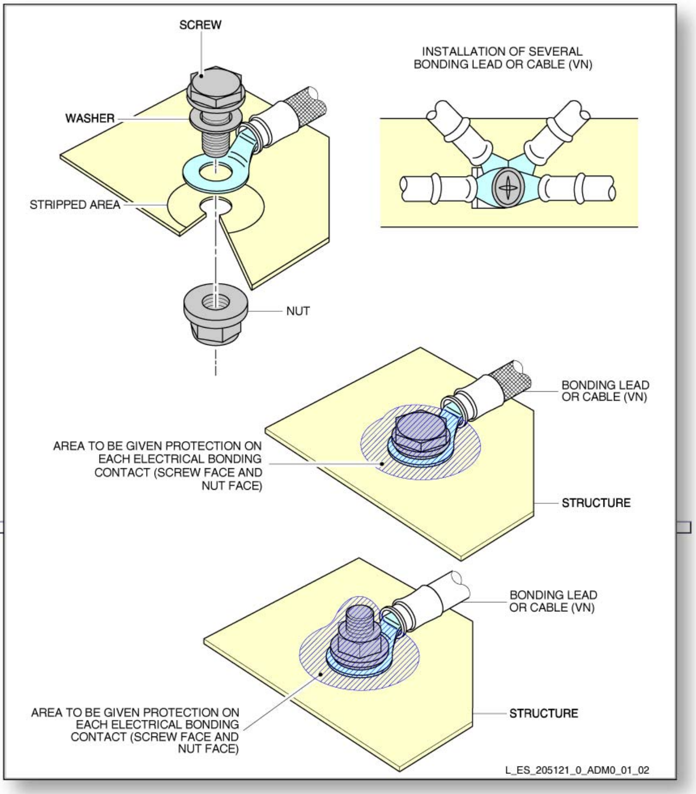
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-51-21 - Bonding by Contact of Attachment Item on Structure - Installation Procedure Bonding Lead or VN Cable



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PRIMARY BONDING

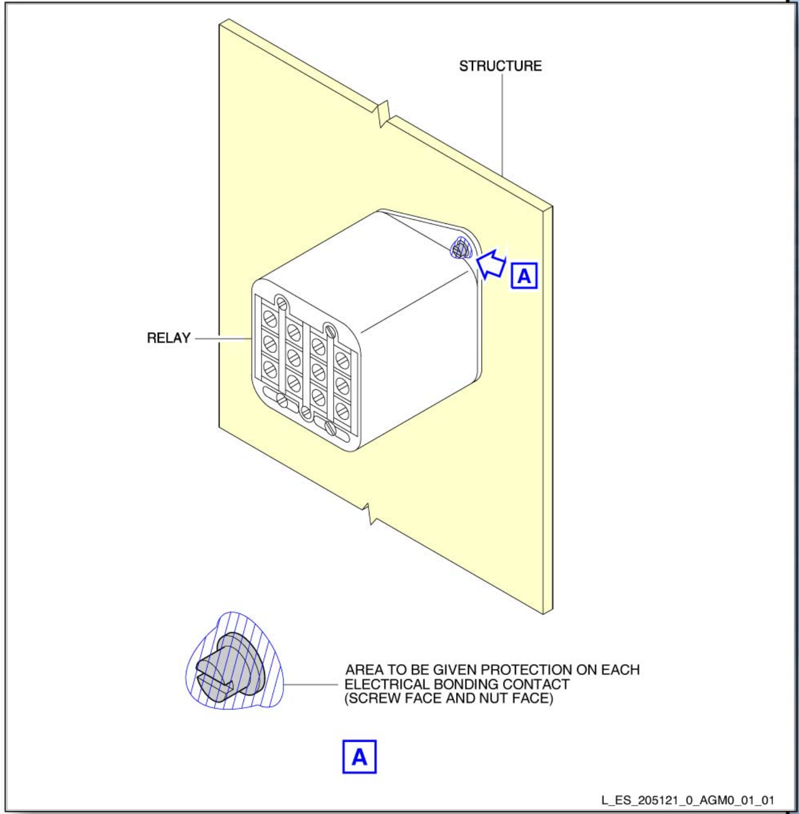
ELECTRICAL BONDING AND GROUNDS

SECONDARY BONDING

Others examples.

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-51-21 - Bonding by Contact of Attachment Item on Structure - Installation Procedure Relay



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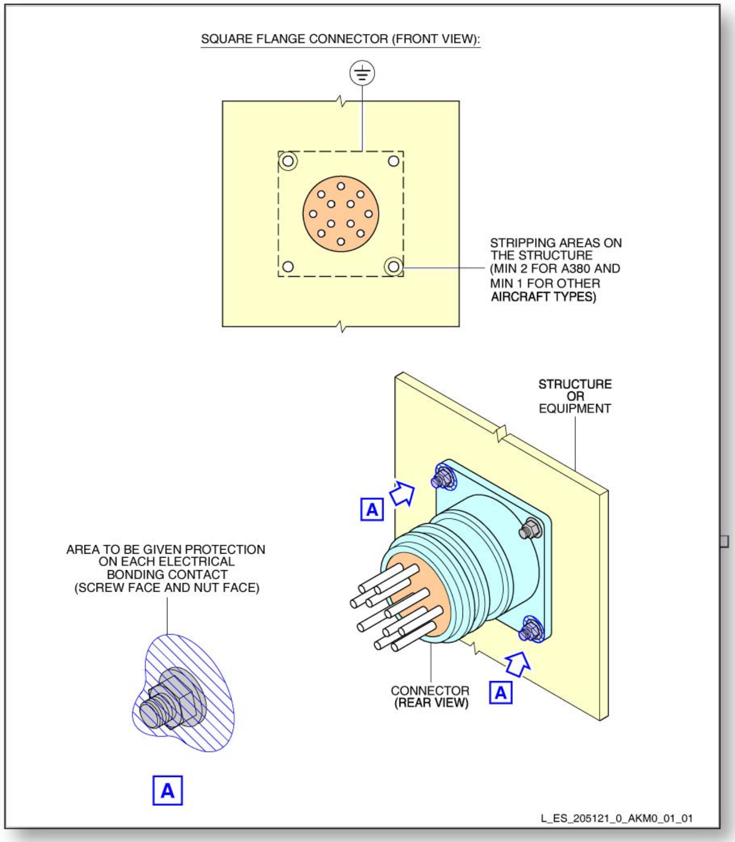
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 005 (Sheet 1) / 20-51-21 - Bonding by Contact of Attachment Item on Structure - Installation Procedure Square Flange Connector



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SECONDARY BONDING

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ELECTRICAL BONDING AND GROUNDS

MAIN TYPES OF BONDING

For electrical bonding, the most common item used is the grounding module.

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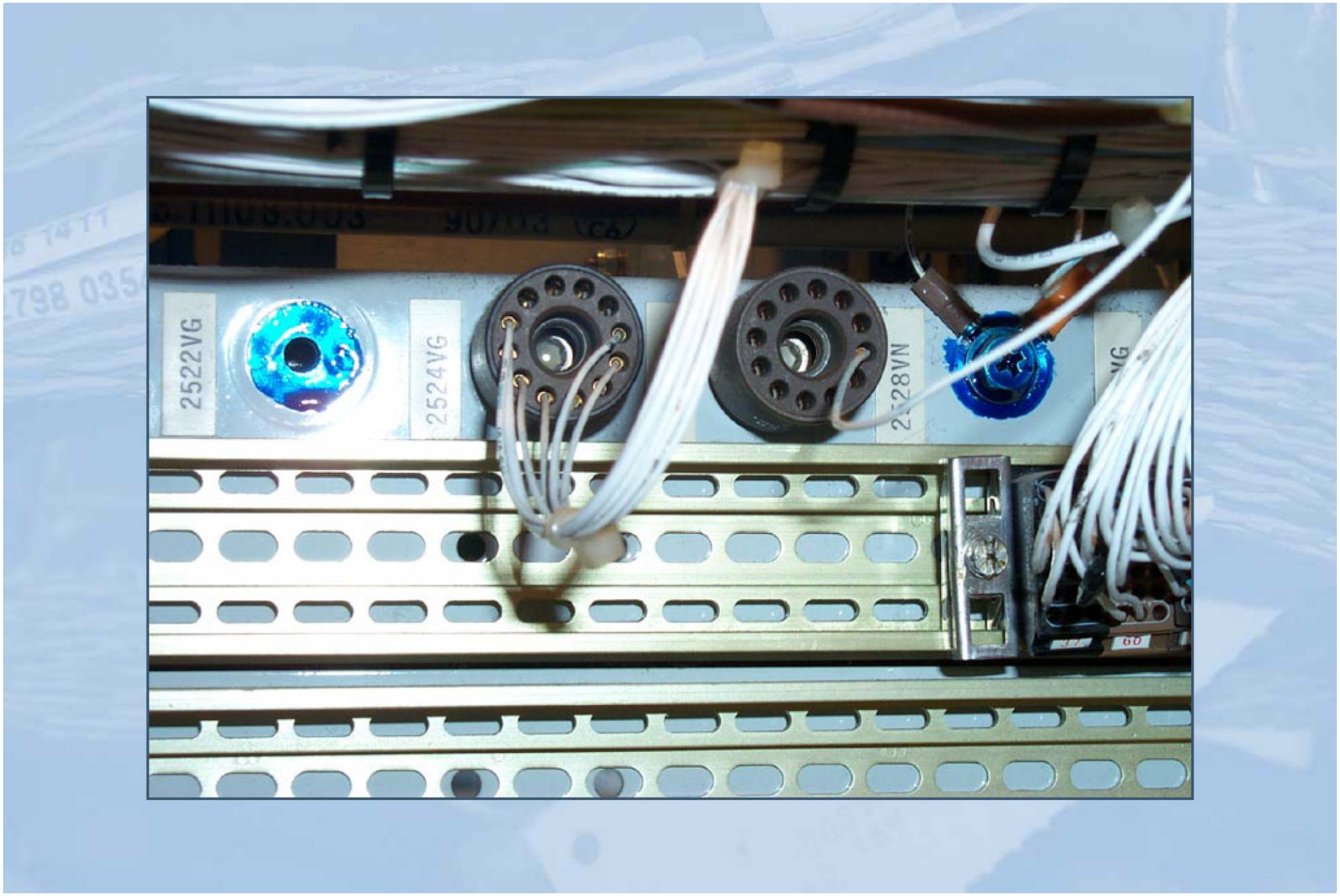

MAIN TYPES OF BONDING

ELECTRICAL BONDING AND GROUNDS

GROUNDING POINTS AND SPECIAL CASES

Grounding points.
Example of material to use for electrical bonding.
Remove the surface protection.
Remove any contamination with cleaning agent.
Before assembling the terminal lugs, apply pure mineral vaseline (Mat 04-516) and clean again. Then, assemble the nut, the bolt, the washer and the terminal.
Apply sealant on the attachment.

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AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

GROUNDING POINTS - DESCRIPTION AND OPERATION

1. General
This chapter gives a typical procedure to do electrical bondings on aircraft.
WARNING: USE SOLVENTS/CLEANING AGENTS, SEALANTS AND OTHER SPECIAL MATERIALS ONLY WITH A GOOD SUPPLY OF AIR.
OBEY THE MANUFACTURERS INSTRUCTIONS.
PUT ON PROTECTIVE CLOTHING.
DO NOT GET THEM IN YOUR MOUTH.
DO NOT SMOKE.
DO NOT BREATHE THE GAS.
THESE MATERIALS ARE POISONOUS, FLAMMABLE AND SKIN IRRITANT.
GET MEDICAL HELP IF YOUR SKIN OR EYES BECOME IRRITATED.

2. Material
The following materials are given for example:
- abrasive paper glass type 1: No specific
- grade 200 emery cloth: No specific
- lint free cloth: No specific
- metallic rotary brush: No specific
- USA VV-P-236
  pure mineralvaseline or petro-latum (MAT 04-012)
- USA TT-I-735 Grade A
  isopropyl alcohol (MAT 11-010)
- USA MIL-S-81733 Type I Class A (MAT 09-013)
  corrosion inhibiting brush consistency
  (Ref. 20-31-00)
- electrical bonding coating (Blue color) (MAT 07-001)
  (Ref. 20-31-00)

3. Removal of the Surface Protection from the bonding areas.
(Ref. Fig. 001)
- Remove the surface protection (Alodine, paint, etc..) from the contact zone with abrasive paper glass or a metallic rotary brush.

NOTE : 1 mm (0.0393 in.) to 4 mm (0.1574 in.) of stripped area must be visible after assembly.

NOTE : You can bond all the cadmium plated, steel or conductive parts without removal of the surface protection and without application of sealant (this does not include the tanks).

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GROUNDING POINTS AND SPECIAL CASES

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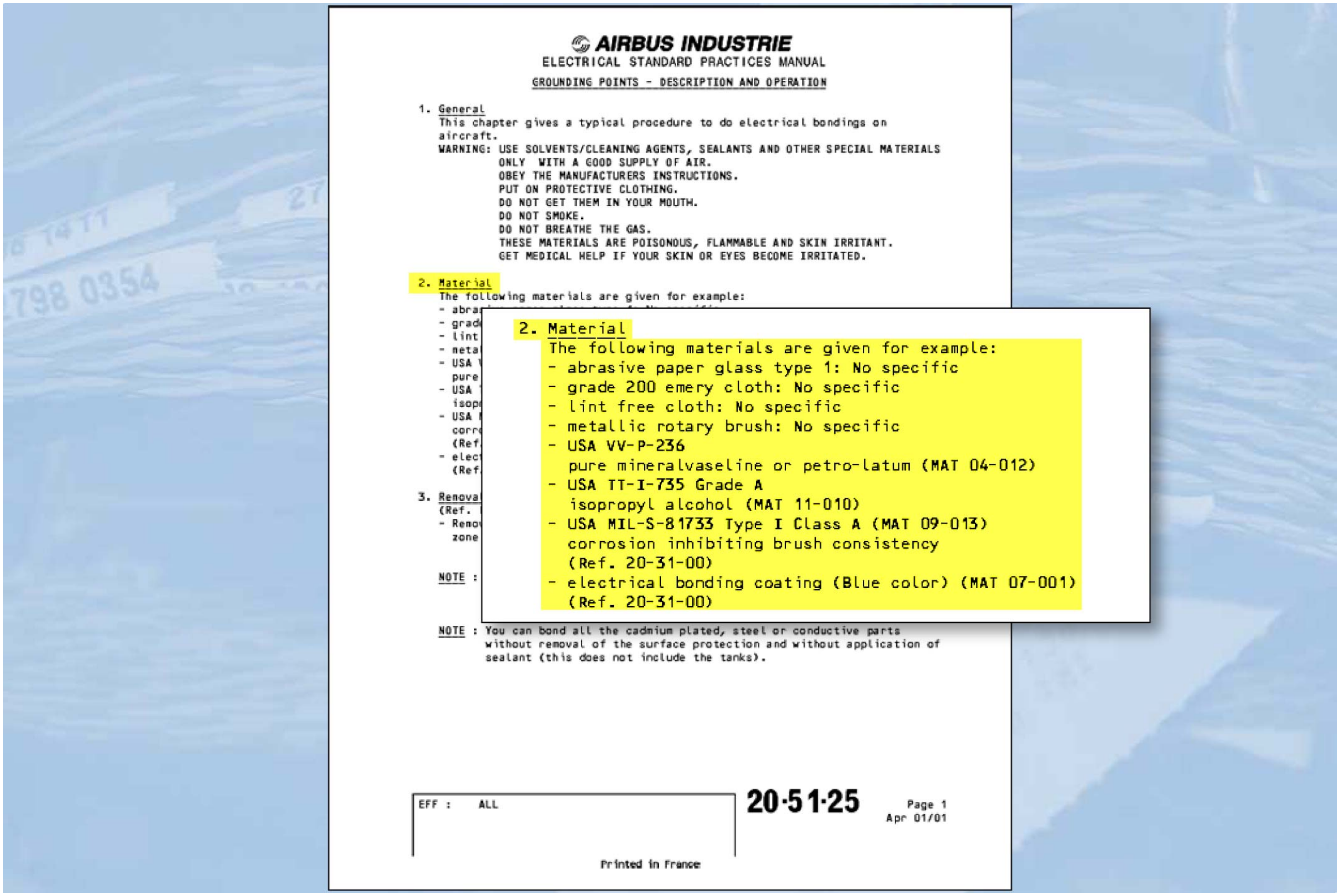

AIRBUS INDUSTRIE
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- grade 200 emery cloth: No specific
- lint free cloth: No specific
- metallic rotary brush: No specific
- USA VV-P-236
  pure mineralvaseline or petro-latum (MAT 04-012)
- USA TT-I-735 Grade A
  isopropyl alcohol (MAT 11-010)
- USA MIL-S-81733 Type I Class A (MAT 09-013)
  corrosion inhibiting brush consistency
  (Ref. 20-31-00)
- electrical bonding coating (Blue color) (MAT 07-001)
  (Ref. 20-31-00)

3. Remova
(Ref.
- Remo
zone

NOTE :

NOTE : You can bond all the cadmium plated, steel or conductive parts without removal of the surface protection and without application of sealant (this does not include the tanks).

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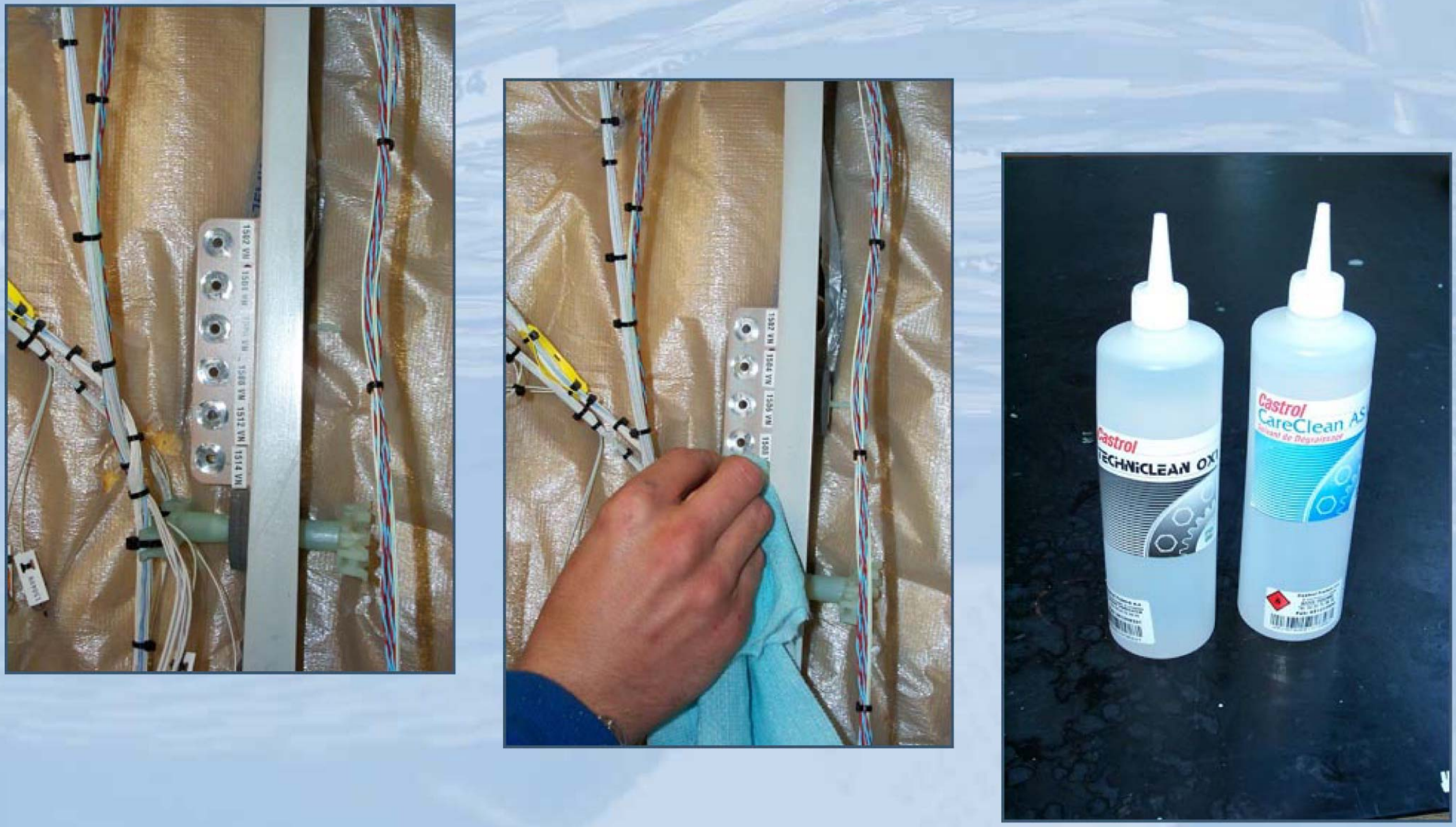
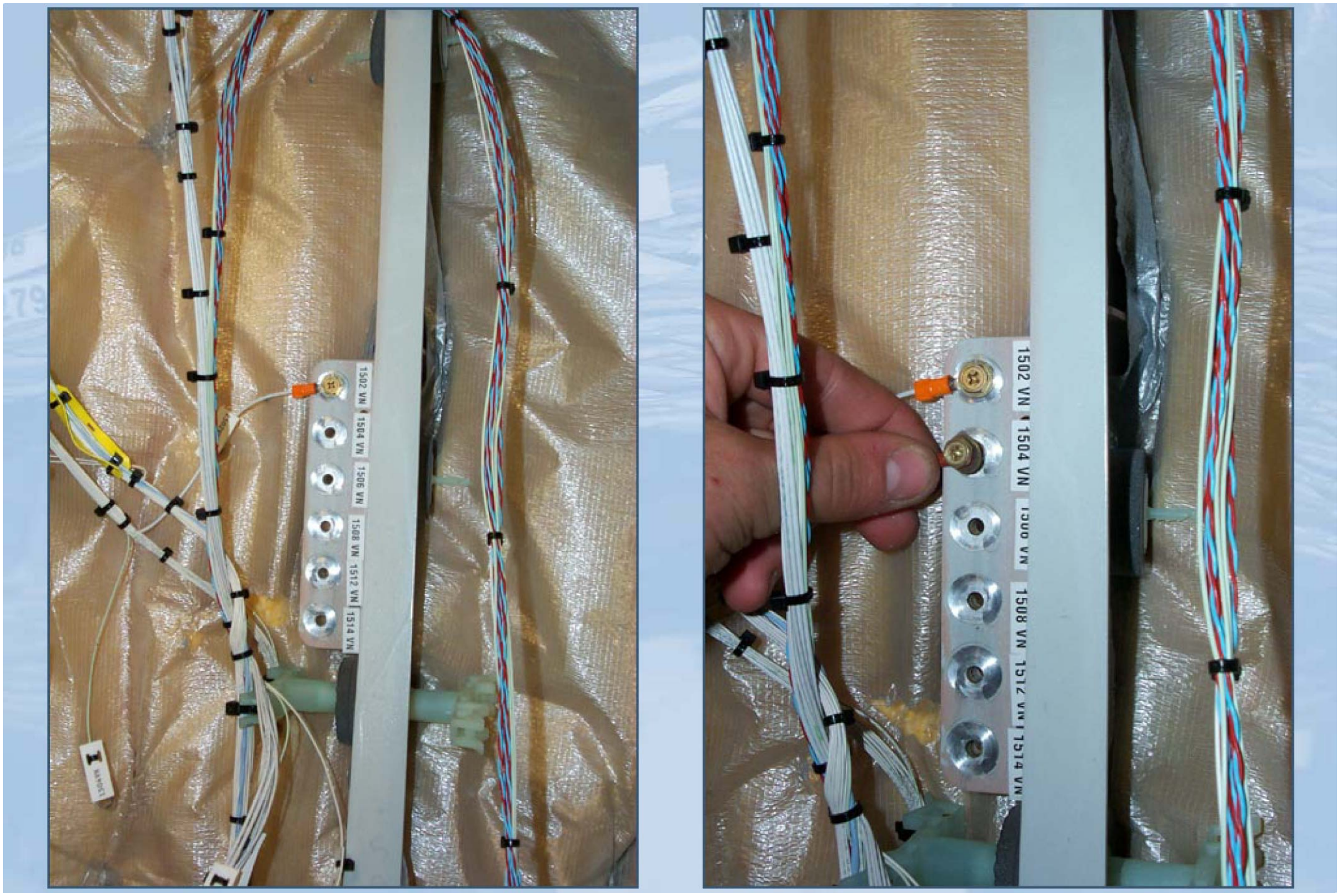
GROUNDING POINTS AND SPECIAL CASES

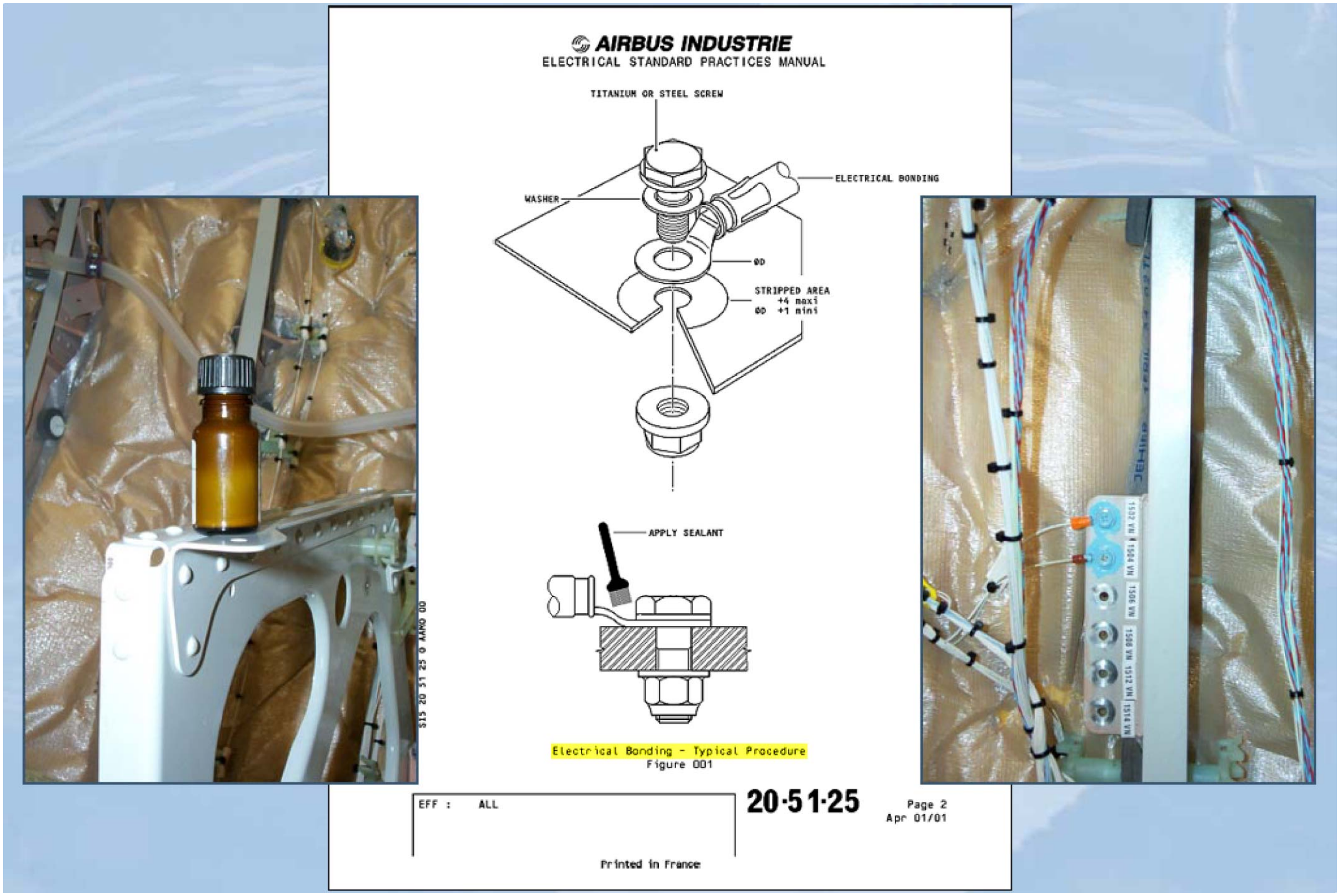
GROUNDING POINTS AND SPECIAL CASES



GROUNDING POINTS AND SPECIAL CASES



GROUNDING POINTS AND SPECIAL CASES



GROUNDING POINTS AND SPECIAL CASES

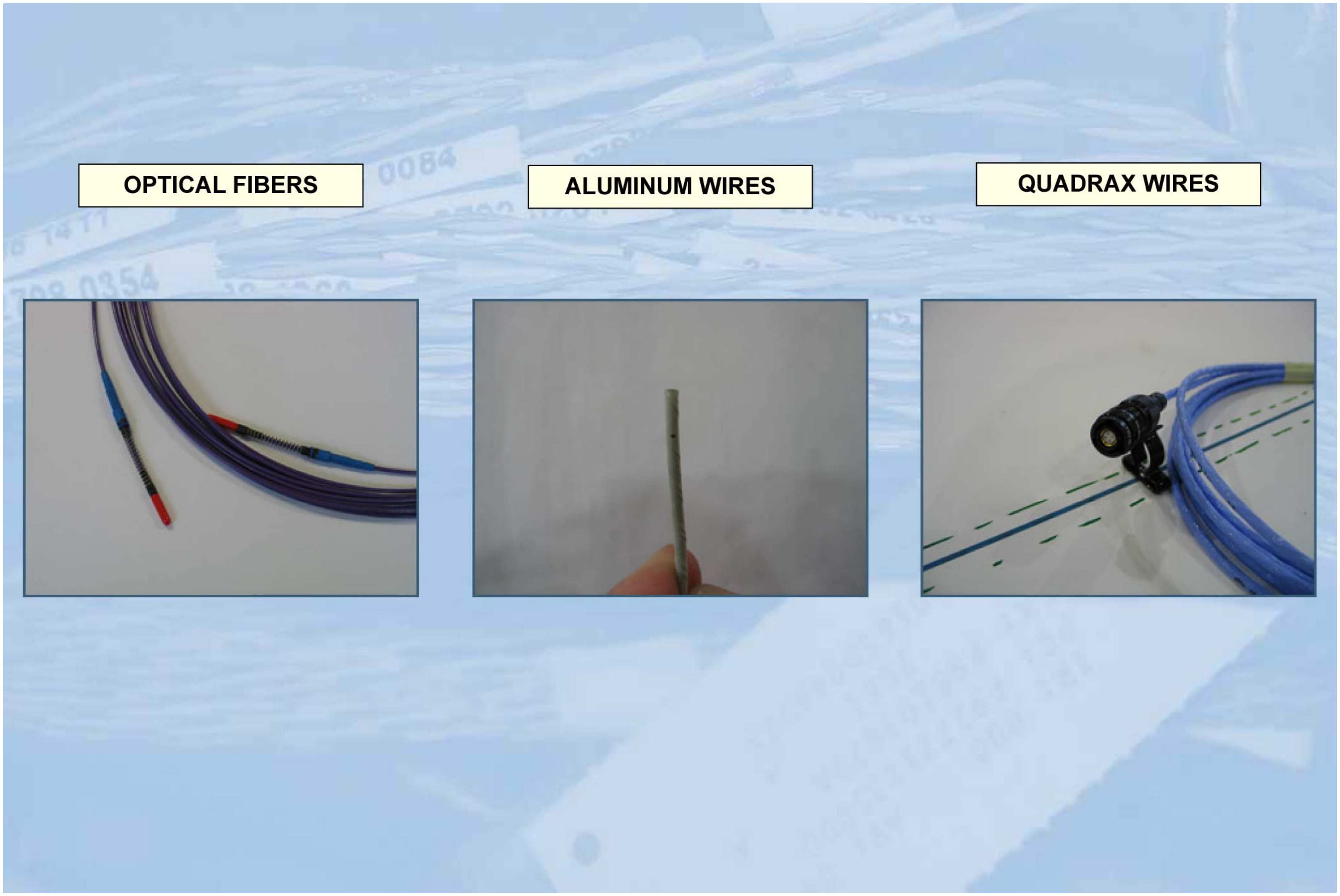
X8U08481 - X0332T0 - XM2031000000001

GROUNDING POINTS AND SPECIAL CASES

OTHER WIRES

INTRODUCTION

In this module, we will give you some information about Optical Fibers, Aluminum wires and Quadrax wires.



INTRODUCTION

OTHER WIRES

OPTICAL FIBERS

Optical fibers are used today for many systems. As an example, you have ETACS, IFE, CDSS etc...
Optical fibers can be installed insides Routes R and S, and this for all areas. They can also be installed inside Route M but only in non pressurized areas. Never install Optical Fibers in Routes P or G.
Depending on the numbers of Optical Fibers to be routed, there are some rules to apply. These rules are retrievable in EPSM.
Concerning the optical contact, we can have two type of installation, with adaptors or without adaptors, depending on the connector.
PNs of these items are retrievable in this table.
It is really mandatory to take care when installing an optical fiber. Bend radius must not be less than 10 times the diameter of the optical fiber wire.
Several reasons can cause an optical fiber fault as described in the ESPM.
There is also a table concerning the possible symptoms for optical fault...
... and explanations on various tools that can be used for testing.
Cleaning of the optical fiber is also explained in details in the ESPM.
Here you have single contact end facing cleaning dry cleaning method.
Other methods are retrievable. Here as an example, you have wet cleaning and dry air cleaning.
When you need to repair an optical fiber on a/c, you have to follow the procedure, described in the ESPM.
With the fusion repair procedure, it is necessary to use the correct tools, as shown here.
And also the applicable optical splice.
Details on this procedure are explained step by step in the ESPM.

OPTICAL FIBERS

OPTICAL FIBERS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 029 (Sheet 1) / 20-33-11 - Manufacture and Installation of Wiring - Specific Tying Recommendations - Optical Fiber Cable and Harness	

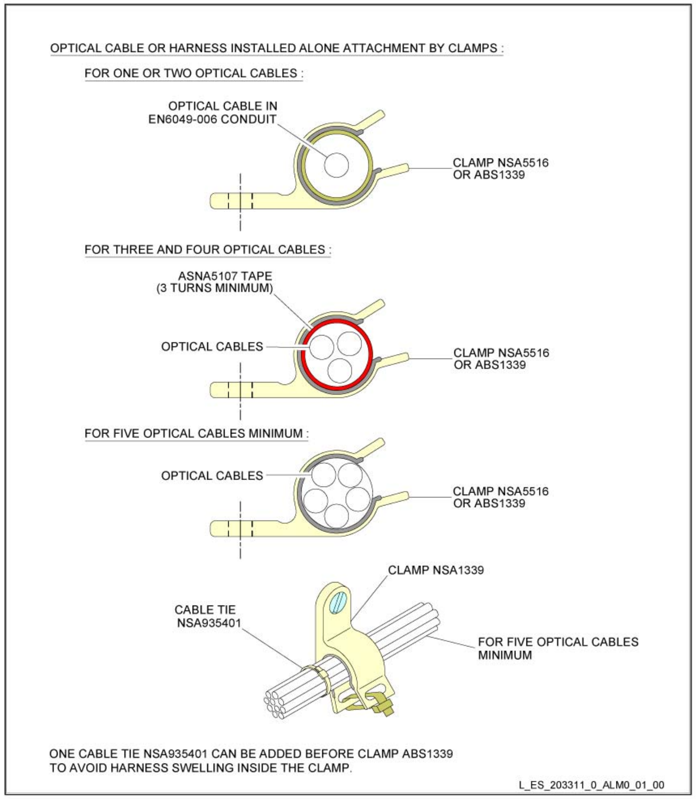


Figure 029 (Sheet 1) / 20-33-11 - Manufacture and Installation of Wiring - Specific Tying Recommendations - Optical Fiber Cable and Harness

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 030 (Sheet 1) / 20-33-11 - Manufacture and Installation of Wiring - Specific Tying Recommendations - Optical Fiber Cable and Harness	

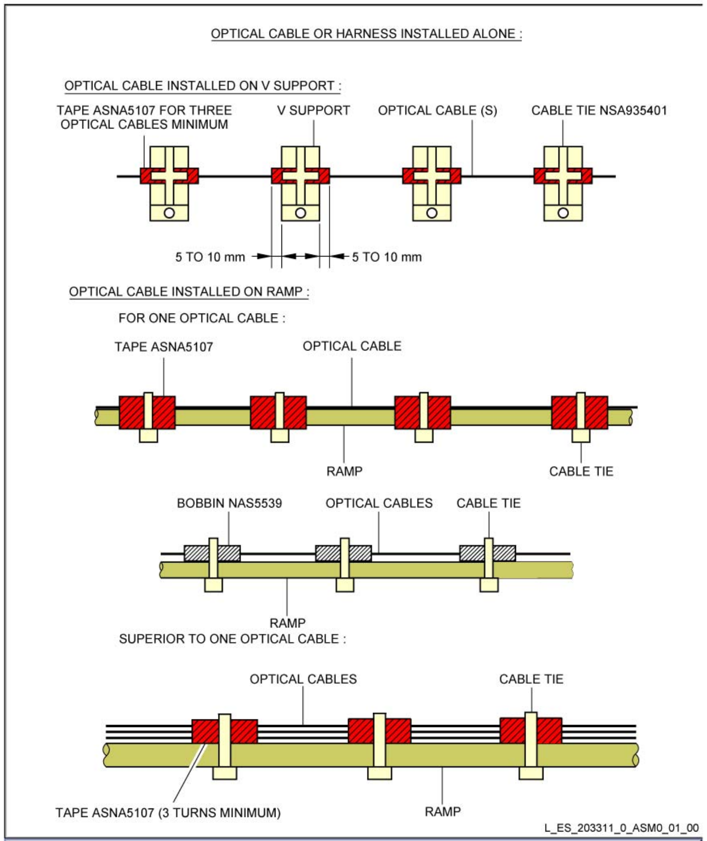

Figure 030 (Sheet 1) / 20-33-11 - Manufacture and Installation of Wiring - Specific Tying Recommendations - Optical Fiber Cable and Harness

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OPTICAL FIBERS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

20-48-91 - OPTICAL CONTACTS (Airbus)

OPTICAL CONTACTS (Airbus)

OPTICAL CONTACTS - DESCRIPTION AND OPERATION

1. General

NOTE: This topic only gives the insertion/extraction procedures of optical contacts for removal/installation of electrical harnesses. Crimping of optical contacts is prohibited on aircraft. For more information, refer to Process and Material Specification Manual (PMS) chapters 01-05-62 and 01-05-63.

The optical contacts installed on aircrafts have the code that follow :
- ABS1379-003

2. Connection procedure for ABS1379-003 optical contacts
The optical contacts ABS1379-003 are installed on aircraft in size 8 connectors cavities with specific adaptors ABS1379-004 and ABS1379-005.
These optical contacts can also be installed in ABS1213 circular connectors in specific cavities (without adaptors).

A. Contact P/N and characteristics

Contact	Adaptor	Adaptor code	USE WITH	
			PLUG	RECEPTACLE
ABS1379-003	ABS1379-004	FR	ABS1054 ABS1340 ABS1343 ARINC404 ARINC600 EN2997 EN3646 EN3545	-
	ABS1379-005	M	-	ABS1054 ABS1426 ABS1427 EN2997 EN3545 EN3646
		M1	-	ARINC600
	-	-	ABS1213	ABS1213

Adaptor interchangeability	
Before february 2007	After february 2007
ABS1379-004FS	ABS1379-004FR

B. Insertion/Extraction Procedure

(1) Insertion of optical contact ABS1379-003 in ABS1379-004/ABS1379-005 adaptors and ABS1213 connector (Ref. Fig. 001)
You must do insertion with your hands or with insertion/extraction tool M81969/14-04. This tool slides on the grommet of the optical contact.
- Engage the end of the contact in the adaptor while you align the locating pin with the locating notch of the adaptor.
- Push the contact until it touches.
- Compress the spring and turn clockwise to lock the assembly with the locking pin.
- Check that the locking pin protrude at the rear of the adaptor after locking.

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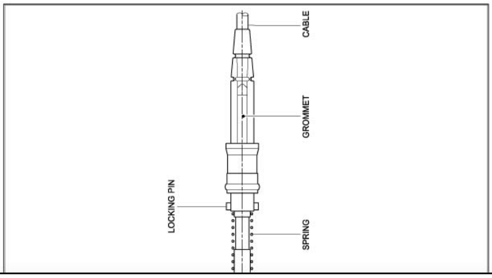
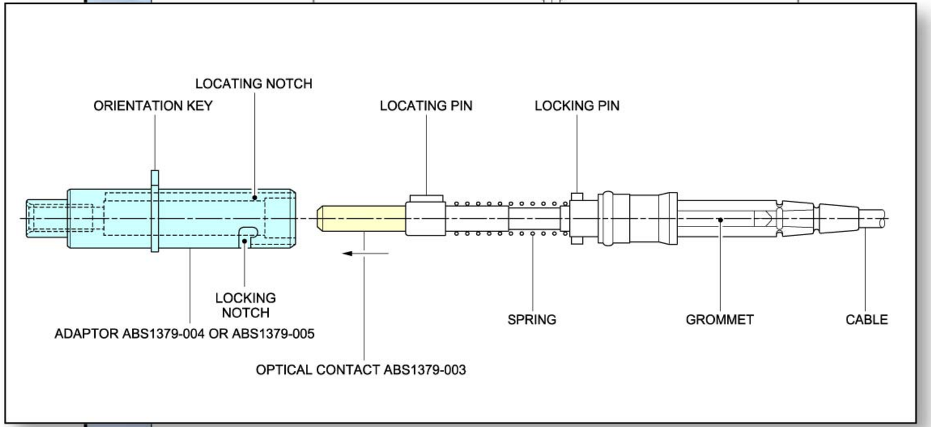
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-48-91 - Optical Contacts - Insertion Procedure of the Optical Contact in the Adaptor ABS1379-003





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OPTICAL FIBERS

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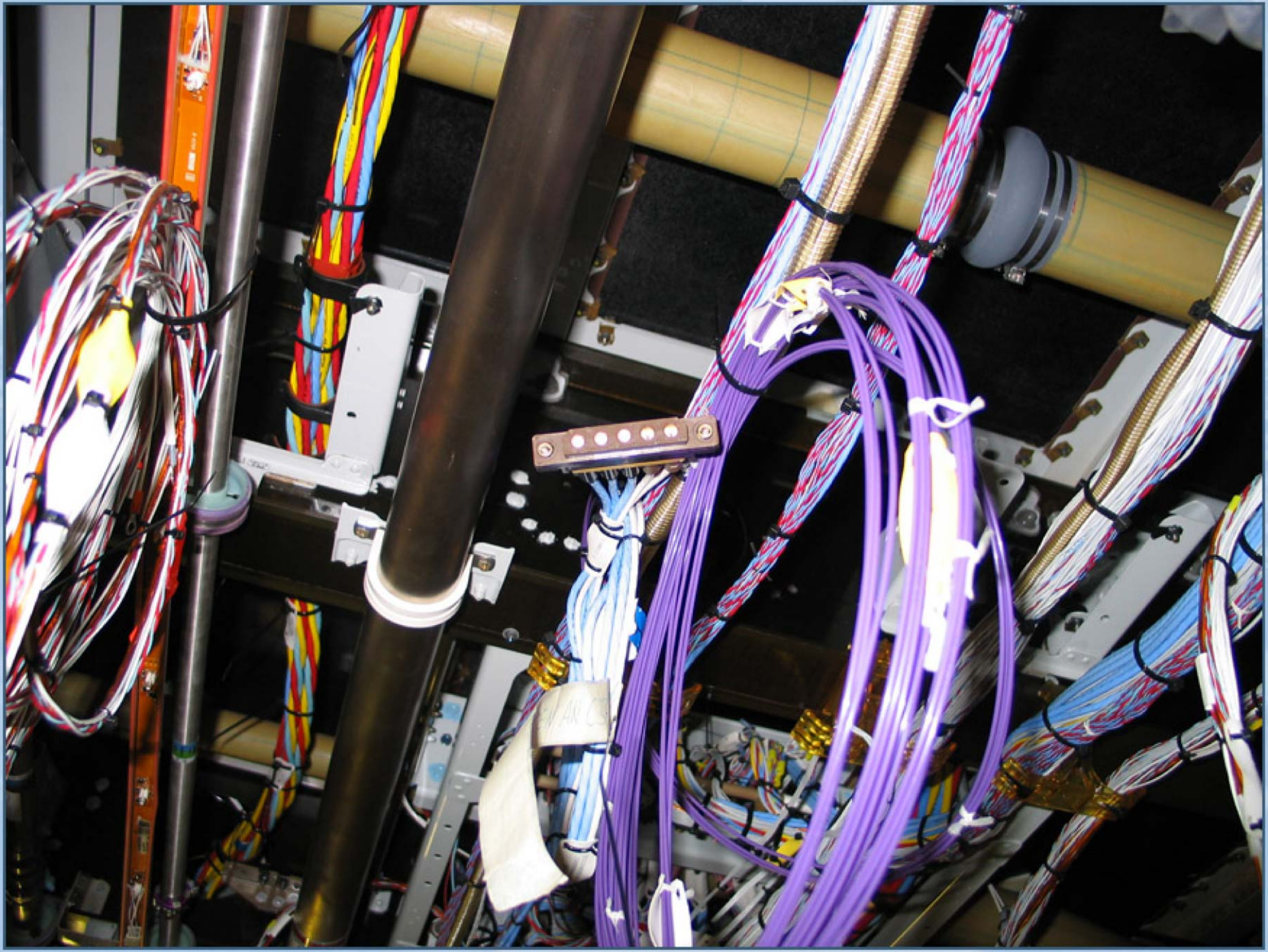

OPTICAL FIBERS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-52-25 - OPTICAL FIBERS TESTS (Airbus)	

OPTICAL FIBERS TESTS (Airbus)

OPTICAL FIBERS TESTS - DESCRIPTION AND OPERATION

WARNING: DO NOT LOOK INTO AN OPTICAL FIBER WHEN IT OPERATES. IT CAN CAUSE INJURY TO YOUR EYES.

1. General Introduction and Principles
This chapter gives the test and fault finding procedures applicable on optical fibers.
   A. Definitions and Abbreviations
      (1) Definitions
      Optical Fiber Link : is an optical cable which has one optical contact at each end.
      Optical Fiber Line : is made of a number of optical links that connect two items of equipment.
      (2) Abbreviations
      IL : Insertion Loss of a link or a line
      LUT : Link or Line Under Test
      P0 : Measured initial optical power in dBm
      P1 : Measured final optical power in dBm
      TLx : Test Lead
      850 or 1300 nm : Wavelength value in nanometers
      ETACS : External and Taxiing Aid Camera System
   B. Structure of ABS0963-003 LF Optical Cable
   (Ref. Fig. 001)
   C. Special Precautions
      (1) Protective Caps
      - Put protective caps on the end faces of the optical contacts until you do the test of the links.
      - Remove the protective caps to do the tests.
      - Put them back again on the cable ends at the end of the test (Refer to chapter 20-54-51).
      (2) Cleaning
      Before you do the test and you reconnect the line, clean the end face of each contact (refer to chapter 20-55-60).
   D. Possible Causes of Optical Fiber Fault

D. Possible Causes of Optical Fiber Fault
(Ref. Fig. 002)
Several reasons can cause an optical fiber fault :
(1) Accidental damage during maintenance or installation procedures
(2) Incorrect installation : the optical fiber is attached too tightly, to much stress applied on the optical fiber, bend radius less than 20 mm (0.7874 in.) (For more information about optical fiber installation, refer to chapter 20-33-11).
(3) Incorrect connection of the links in the optical fiber line.
(4) Contamination of the optical end faces (Refer to chapter 20-55-60).
The result of all these causes can be an insertion loss or a total disruption of the transmitted signal.
If an optical fiber breaks, a total loss of the transmitted signal can occur.
But the fiber protection will hold the pieces together, and thus the optical fiber will continue to send signals. But if there is flexing, bending or too much vibration of the fiber, the signals will be intermittent.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-52-25 - OPTICAL FIBERS TESTS (Airbus)	

(3) Start the system, do a power measurement and record it.
(4) Compare the recorded measurement with the optical power- level requirements of the system (these requirements are specified defined by the range of optical power levels necessary for correct operation of the disconnected equipment).
E. Results
   (1) The measured optical power-level agrees with the power level requirements
      (a) Interpretation
      The line is continuous from one end to the other and its operation agrees with the requirements.
   (2) The measured optical power-level does not agree with the power level requirements
      (a) Interpretation
      The related line is defective and there is an optical fault or break in the line.
      (b) Limitations
      This test does not give the location of the optical fault in the line or the type of damage. You must do more tests.

3. Optical Continuity Check - Description and Operation

3. Optical Continuity Check - Description and Operation

WARNING: DO NOT LOOK INTO AN OPTICAL FIBER WHEN IT OPERATES. IT CAN CAUSE INJURY TO YOUR EYES.

A. Reason for the Job
To make sure that the optical fiber link or line is serviceable.
Optical continuity is necessary for the correct operation of optical systems. An optical continuity check is a simple and quick method to make sure that the optical integrity of an optical fiber link or line is correct.
Principle :
(Ref. Fig. 003)
- To do this check, use :
- A Visual Fault Locator (VLF/VCT) and an adaptor to inject a pulsed light in the optical fiber line at one end. You must see the light at the other end, not directly (on a sheet of paper for example).
This test method lets you do the continuity checks on each link of the optical line to find the defective link.
B. Job Set-Up Information
   (1) Fixture, Tools, Test and Support Equipment
   (Ref. Fig. 007)

REFERENCE	QTY DESIGNATION
No Specific Tester	Visual Fault Locator/Visual Continuity

NOTE: For more data about the VFL/VCT minimum requirements, refer to the related table.

C. Job Set-Up
   (1) VFL/VCT Checks
   Before you start the continuity test :
      (a) Make sure that the VFL/VCT operates correctly (you can see the light on a sheet of paper).
      (b) Then, switch off the VFL/VCT and make sure that no energy is transmitted.
D. Procedure
(Ref. Fig. 003)

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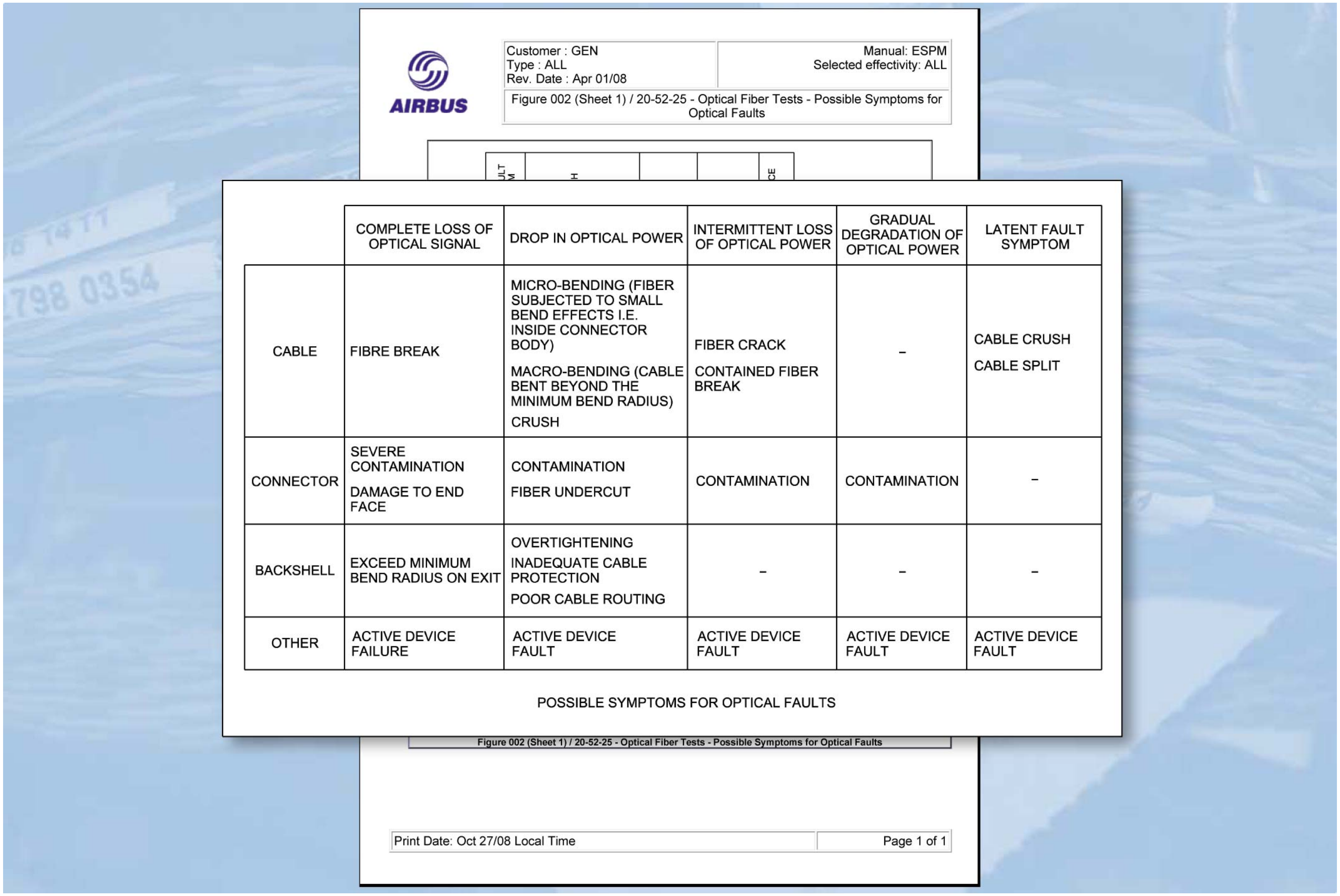
OPTICAL FIBERS



Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-52-25 - Optical Fiber Tests - Possible Symptoms for Optical Faults

	COMPLETE LOSS OF OPTICAL SIGNAL	DROP IN OPTICAL POWER	INTERMITTENT LOSS OF OPTICAL POWER	GRADUAL DEGRADATION OF OPTICAL POWER	LATENT FAULT SYMPTOM
CABLE	FIBRE BREAK	MICRO-BENDING (FIBER SUBJECTED TO SMALL BEND EFFECTS I.E. INSIDE CONNECTOR BODY) MACRO-BENDING (CABLE BENT BEYOND THE MINIMUM BEND RADIUS) CRUSH	FIBER CRACK CONTAINED FIBER BREAK	–	CABLE CRUSH CABLE SPLIT
CONNECTOR	SEVERE CONTAMINATION DAMAGE TO END FACE	CONTAMINATION FIBER UNDERCUT	CONTAMINATION	CONTAMINATION	–
BACKSHELL	EXCEED MINIMUM BEND RADIUS ON EXIT	OVERTIGHTENING INADEQUATE CABLE PROTECTION POOR CABLE ROUTING	–	–	–
OTHER	ACTIVE DEVICE FAILURE	ACTIVE DEVICE FAULT	ACTIVE DEVICE FAULT	ACTIVE DEVICE FAULT	ACTIVE DEVICE FAULT

POSSIBLE SYMPTOMS FOR OPTICAL FAULTS

Figure 002 (Sheet 1) / 20-52-25 - Optical Fiber Tests - Possible Symptoms for Optical Faults

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OPTICAL FIBERS

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-52-25 - Optical Fiber Tests - Test Equipment Characteristics Power Meter Requirements

CHARACTERISTICS	REMARKS
SINGLE OR MULTI WAVELENGTH POWER METER	850 nm 1300 nm ± 30 nm
DETECTABLE OPTICAL POWER	-40 dBm TO +3 dBm
FIBER COMPATIBILITY	62.5 / 125 μm
RECEPTOR DIAMETER	1 mm MINIMUM

POWER METER REQUIREMENTS

EXAMPLE OF POWER METER

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-55-60 - Cleaning of Optical Fibers - Single Optical Contact End Facing Cleaning Dry Cleaning Method

DRY CLEANING METHOD

CLEANING WITH A LINT FREE WIPE

CLEANING WITH A CARTRIDGE CLEANER

CLEANING WITH A POCKET CARD CLEANER

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OPTICAL FIBERS

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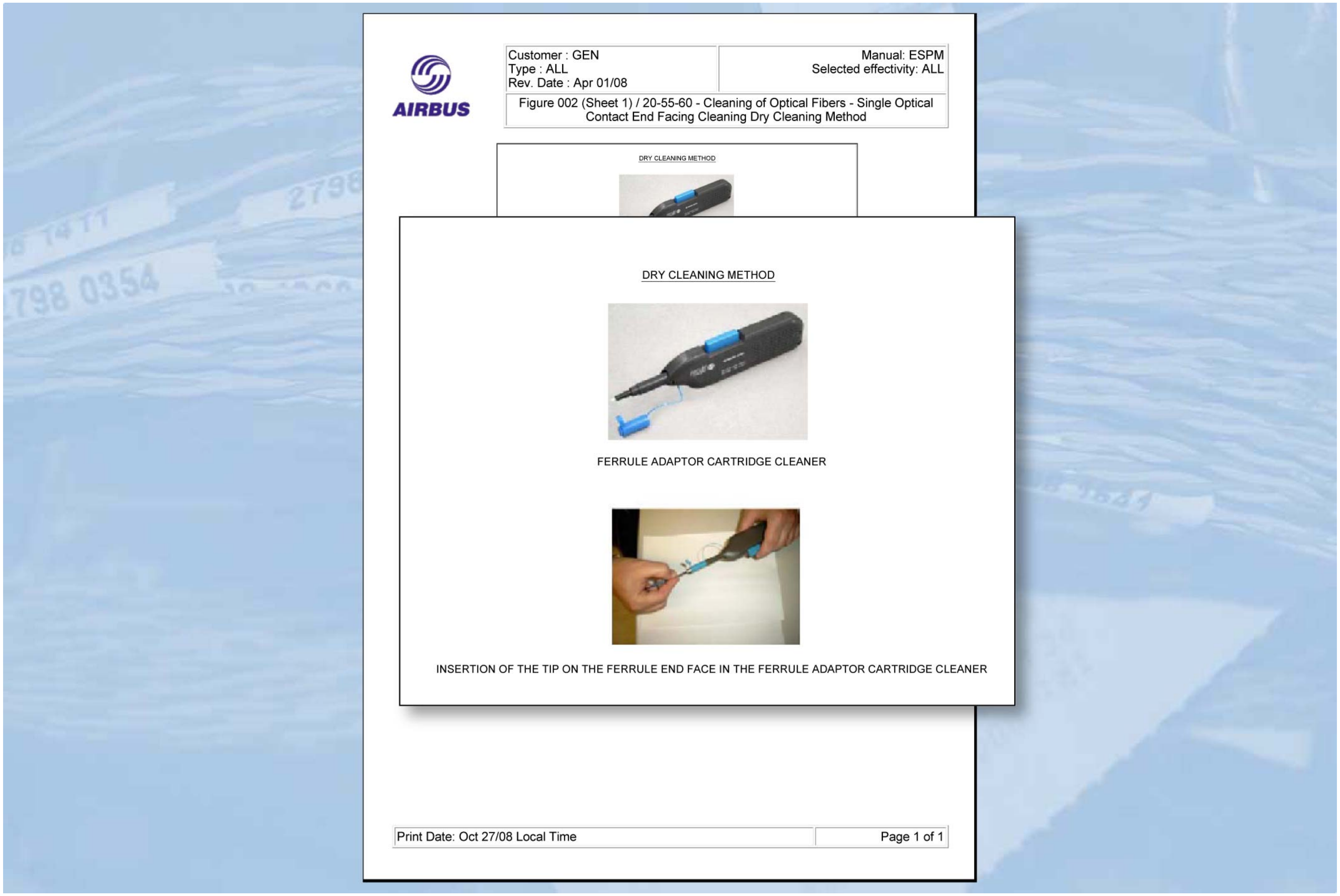

OPTICAL FIBERS

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 008 (Sheet 1) / 20-55-60 - Cleaning of Optical Fibers - Connector Installed Optical End Face Cleaning Wet and Dry Air Cleaning Methods

WET CLEANING METHOD

OPTICAL END FACE CLEANING WITH MOISTEN SWAB OR CLEANING WAND (ABS1906-001 CONTACT)

OPTICAL END FACE CLEANING WITH MOISTEN SWAB OR CLEANING WAND (ABS0929-004 CONTACT)

DRY AIR CLEANING METHOD

CLEANING OF OPTICAL CONTACTS USING PROPELLANT FREE AIR

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OPTICAL FIBERS

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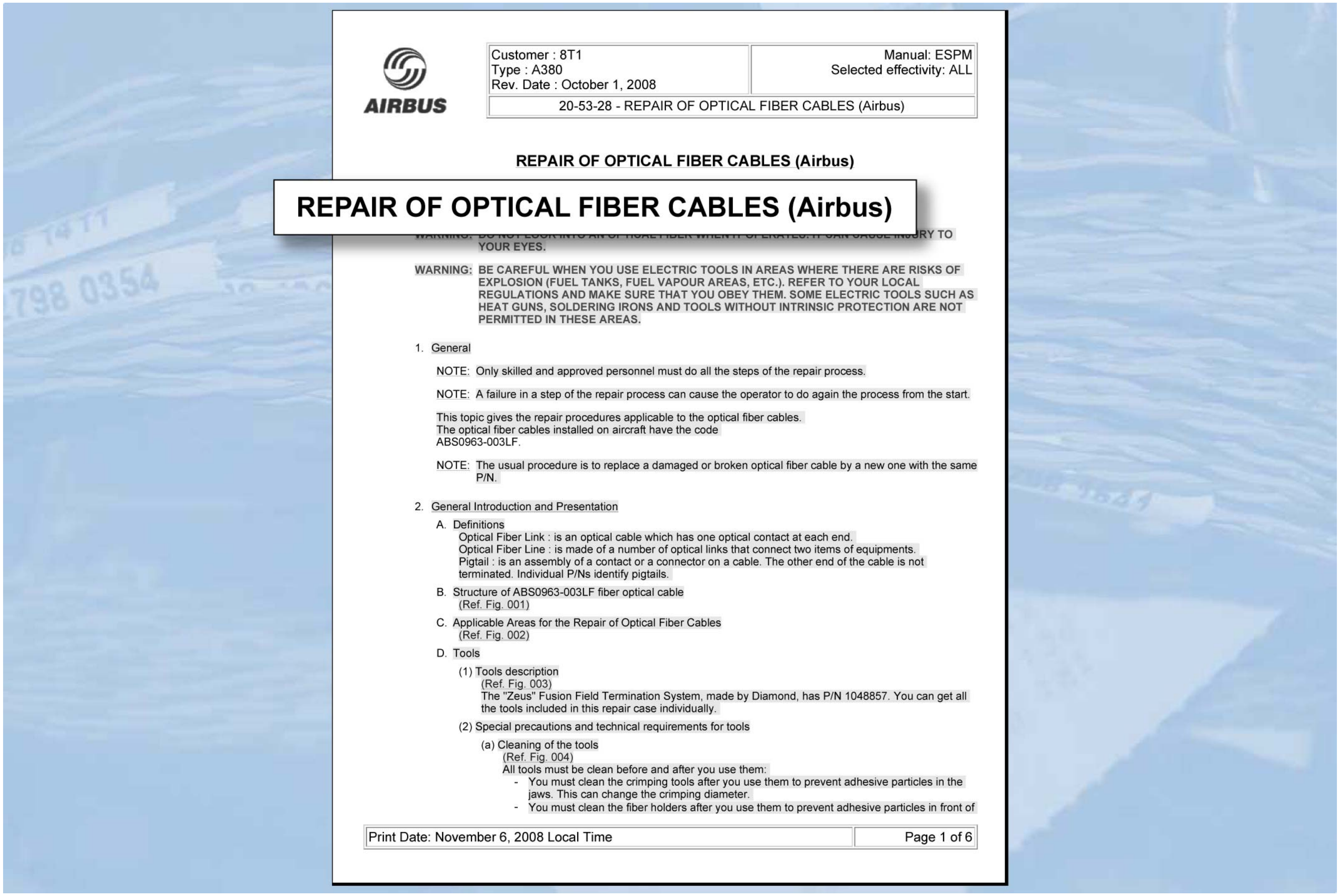

Customer : 8T1 Type : A380 Rev. Date : October 1, 2008	Manual: ESPM Selected effectivity: ALL
20-53-28 - REPAIR OF OPTICAL FIBER CABLES (Airbus)	

REPAIR OF OPTICAL FIBER CABLES (Airbus)

REPAIR OF OPTICAL FIBER CABLES (Airbus)

RY TO YOUR EYES.

WARNING: BE CAREFUL WHEN YOU USE ELECTRIC TOOLS IN AREAS WHERE THERE ARE RISKS OF EXPLOSION (FUEL TANKS, FUEL VAPOUR AREAS, ETC.). REFER TO YOUR LOCAL REGULATIONS AND MAKE SURE THAT YOU OBEY THEM. SOME ELECTRIC TOOLS SUCH AS HEAT GUNS, SOLDERING IRONS AND TOOLS WITHOUT INTRINSIC PROTECTION ARE NOT PERMITTED IN THESE AREAS.

1. General

NOTE: Only skilled and approved personnel must do all the steps of the repair process.

NOTE: A failure in a step of the repair process can cause the operator to do again the process from the start.

This topic gives the repair procedures applicable to the optical fiber cables.
The optical fiber cables installed on aircraft have the code
ABS0963-003LF.

NOTE: The usual procedure is to replace a damaged or broken optical fiber cable by a new one with the same P/N.

2. General Introduction and Presentation

A. Definitions
Optical Fiber Link : is an optical cable which has one optical contact at each end.
Optical Fiber Line : is made of a number of optical links that connect two items of equipments.
Pigtail : is an assembly of a contact or a connector on a cable. The other end of the cable is not terminated. Individual P/Ns identify pigtails.

B. Structure of ABS0963-003LF fiber optical cable
(Ref. Fig. 001)

C. Applicable Areas for the Repair of Optical Fiber Cables
(Ref. Fig. 002)

D. Tools

(1) Tools description
(Ref. Fig. 003)
The "Zeus" Fusion Field Termination System, made by Diamond, has P/N 1048857. You can get all the tools included in this repair case individually.

(2) Special precautions and technical requirements for tools

(a) Cleaning of the tools
(Ref. Fig. 004)
All tools must be clean before and after you use them:
- You must clean the crimping tools after you use them to prevent adhesive particles in the jaws. This can change the crimping diameter.
- You must clean the fiber holders after you use them to prevent adhesive particles in front of

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OPTICAL FIBERS

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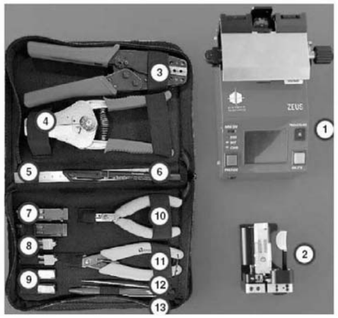
Customer : 8T1 Type : A380 Rev. Date : October 1, 2008	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-53-28 - Repair of Optical Fiber Cables - Fusion Kit Composition

FUSION KIT CONSTITUTION



ITEM NUMBER	TOOL	DIAMOND REFERENCE
1	"ZEUS" FUSION SPLICER	1041878
2	CLEANING UNIT - "DCU2 FIBER CUTTER - PRECISION FIBRE CLEANER	1047174
3	CRIMPING TOOL FOR CONNECTOR BUSHING/SLEEVE - CRIMPING PLIERS	000-004-884M000
4	CABLE STRIPPING HAND TOOL - OUTER JACKET STRIPPING TOOL	1019341
5	RULER	1020537
6	PEN - PERMANENT MAKER	1900109
7	SUPPORT FOR STRIPPING TONGS (X2)	000-004-886M000
8	HOLDEN FOR FUSION SPECIAL CROCODILE (X2)	000-003-765M000
9	FIBER HOLDER DX (X2)	000-004-938M000
10	STRIPPING TOOL - 900 µm	1021540 OR EREM 552S
11	SCISSORS FOR KEVLAR CUTTER	1020713 OR MILLER FOKC
12	ELECTRODE TWEEZERS	1020798
13	STYLO FOR KEVLAR	000-004-936M000

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Figure 003 (Sheet 1) / 20-53-28 - Repair of Optical Fiber Cables - Fusion Kit Composition

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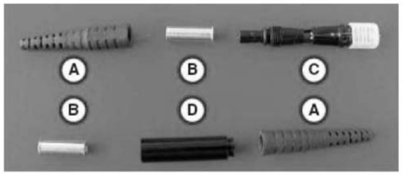
OPTICAL FIBERS

Customer : 8T1 Type : A380 Rev. Date : October 1, 2008	Manual: ESPM Selected effectivity: ALL
Figure 005 (Sheet 1) / 20-53-28 - Repair of Optical Fiber Cables - ABS1632-003 Optical Splice Structure	

OPTICAL SPLICE ABS1632-003 CONSTITUTION



ITEM NUMBER	DESCRIPTION
A	CABLE BOOT
B	CRIMPING SLEEVE
C	SPECIAL CROCODILE
D	PROTECTIVE CAP

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Figure 005 (Sheet 1) / 20-53-28 - Repair of Optical Fiber Cables - ABS1632-003 Optical Splice Structure

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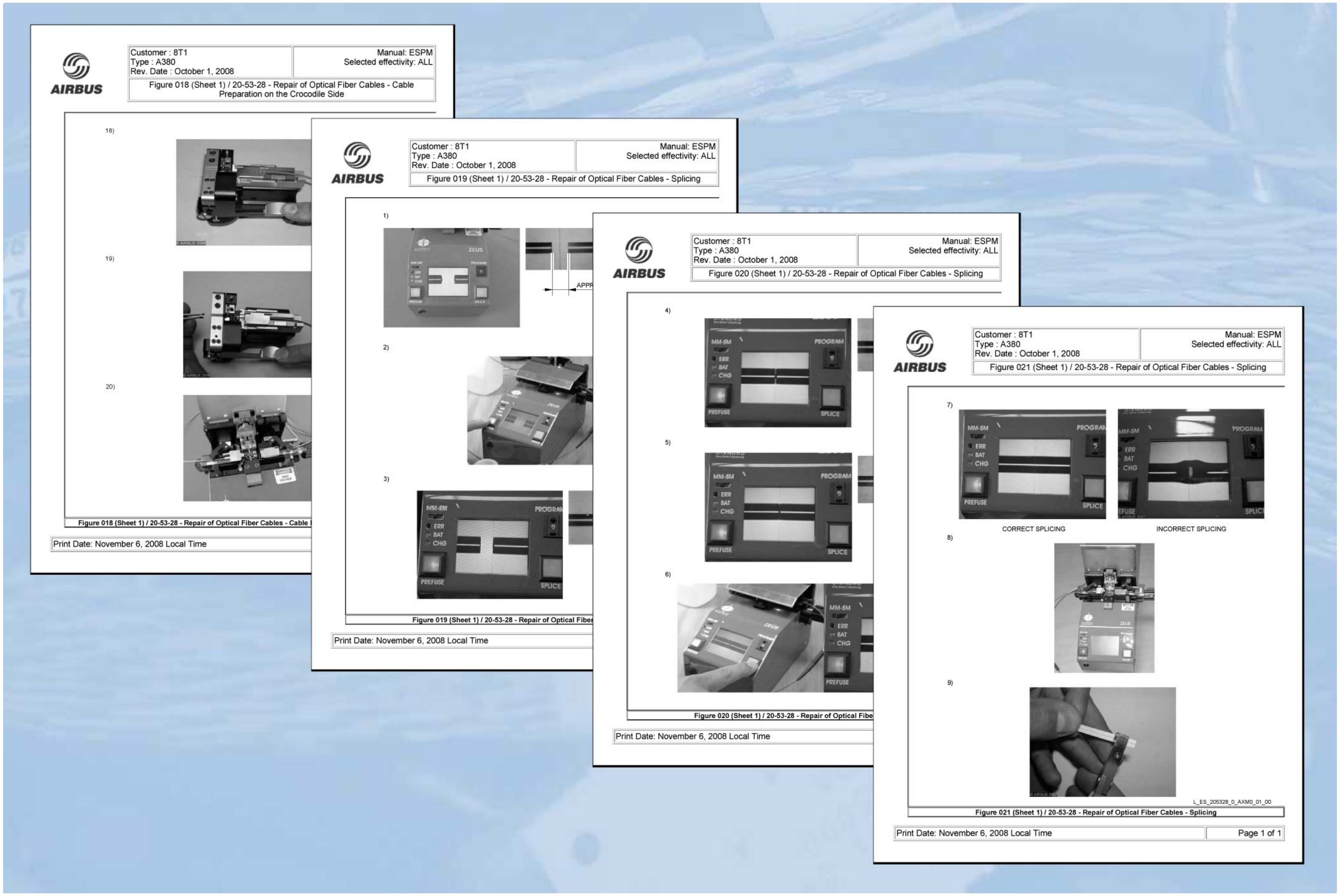
OPTICAL FIBERS



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OTHER WIRES

ALUMINUM WIRES

Now, as a second part of this module, we will talk about Aluminum wires.

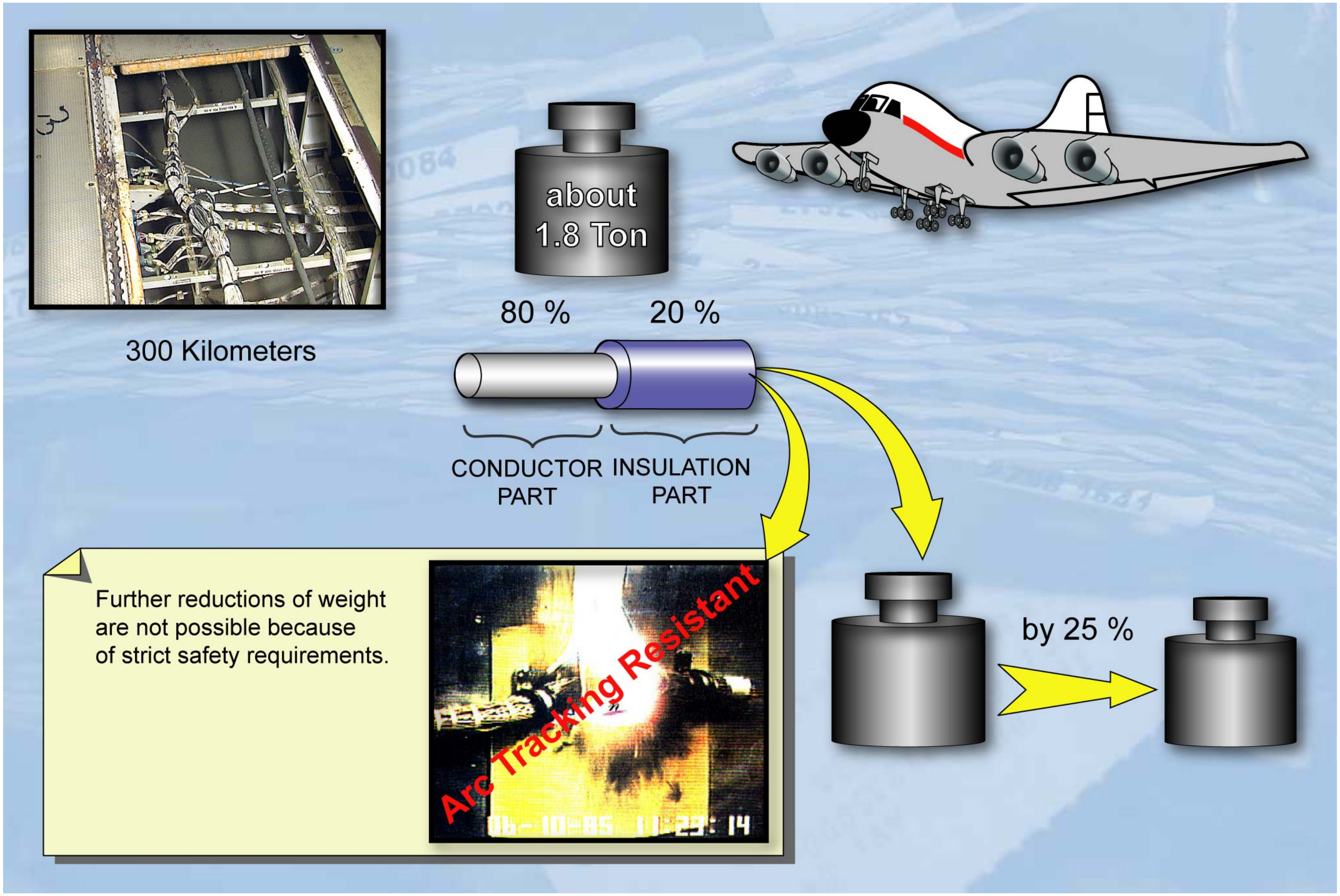
ALUMINUM WIRES

OTHER WIRES

ALUMINUM WIRES (continued)

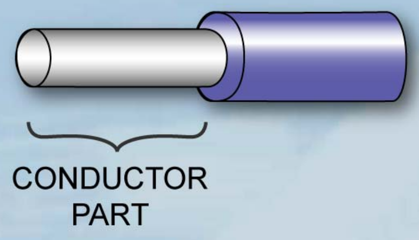
Reasons for introduction of Aluminum wires

Large commercial Aircraft uses more than 300km of electrical wires with a total weight of about 1.8 tons.
For an average wire gauge, the wire weight comes about 80% from the conductor material and 20% from the insulation.
The Insulation weight was reduced already by 25% compared to the first generation of jet aircraft 50 years ago.
Further reductions are not possible, because of strict safety requirements.
The weight of the conductor depends on the wire gauge and the material.
Aluminum has only about 30% of the specific gravity of copper, but unfortunately about 60% more electric resistance.
To keep the wire resistance of an aluminum wire identical to a copper wire, you must increase the crossectional area of the aluminum wire by about 60%.
But even with the larger crosssection you will get a weight reduction of about 50% for heavy wires for generator feeder lines and heavy loads.
This weight saving is already done on present aircraft types and has a value up to 200 kg.

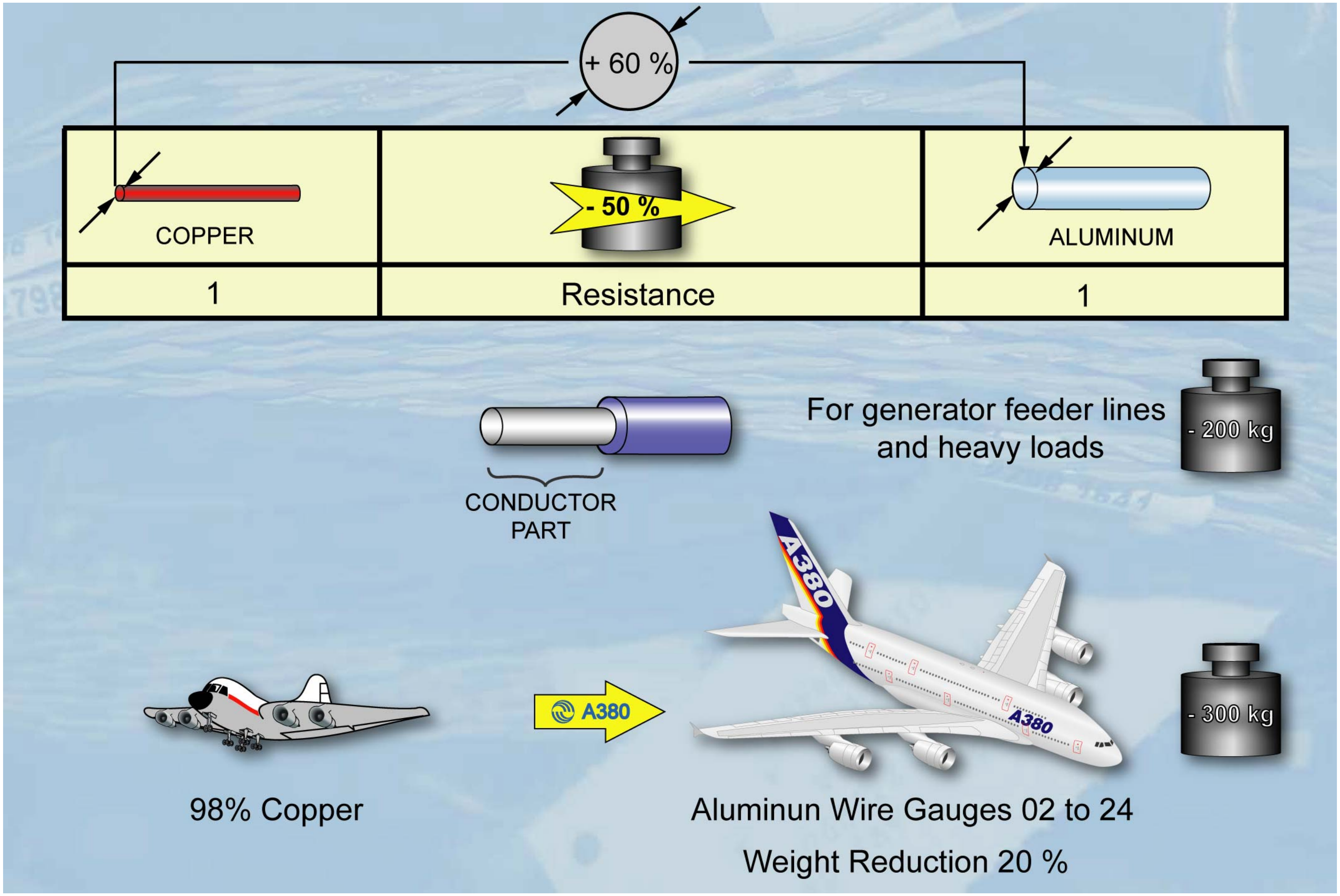


ALUMINUM WIRES - REASONS FOR INTRODUCTION OF ALUMINUM WIRES

COPPER	Properties	ALUMINUM
1	Specific Gravity	0'3
(very low) 1	Resistance	1'6



ALUMINUM WIRES - REASONS FOR INTRODUCTION OF ALUMINUM WIRES



ALUMINUM WIRES - REASONS FOR INTRODUCTION OF ALUMINUM WIRES

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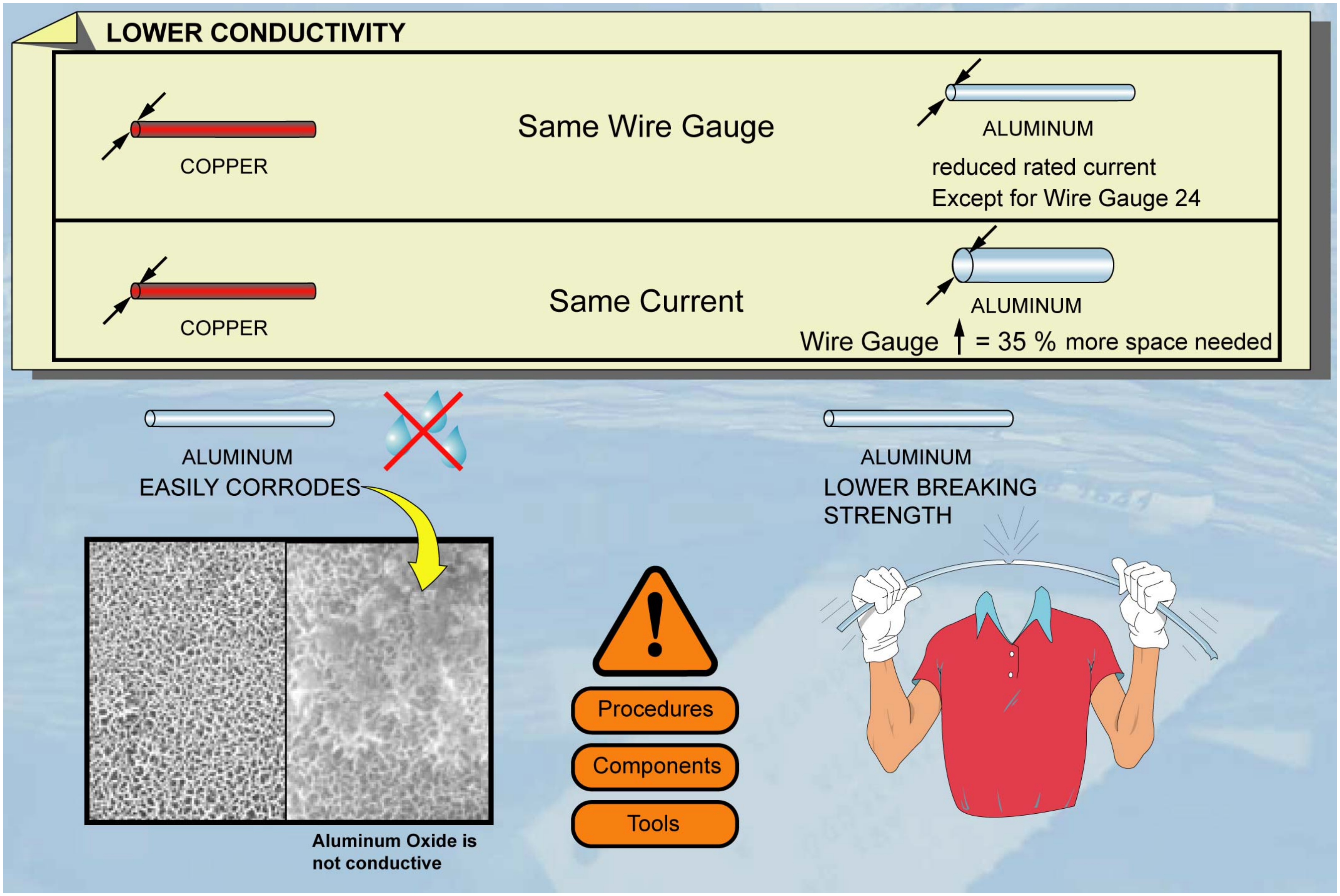
OTHER WIRES

ALUMINUM WIRES (continued)

Disadvantages of aluminum wires

Aluminum has some disadvantages over copper: The first one comes from the lower conductivity of aluminum.
If the wire gauge is identical to both materials you have to reduce the rated current, except for wire gauge 24 because these wires are primarily used as signal lines and therefore not loaded with the rated current.
If the rated current must be kept consequently you need a larger cross-section of the wire, which gives a space penalty of about 35%.
The second disadvantage and a potential risk for aircraft reliability is that Aluminum easily corrodes and that the aluminum oxide is not conductive. Consequently aluminum material must never come in contact with any kind of humidity.
Another potential risk is the lower breaking strength of pure Aluminum compared to copper. This must be taken into account by the wire, contact and splice construction and the installation procedures must be strictly followed.
To prevent any problems with aluminum wires, specific procedures must be followed and special components and tools must be used.



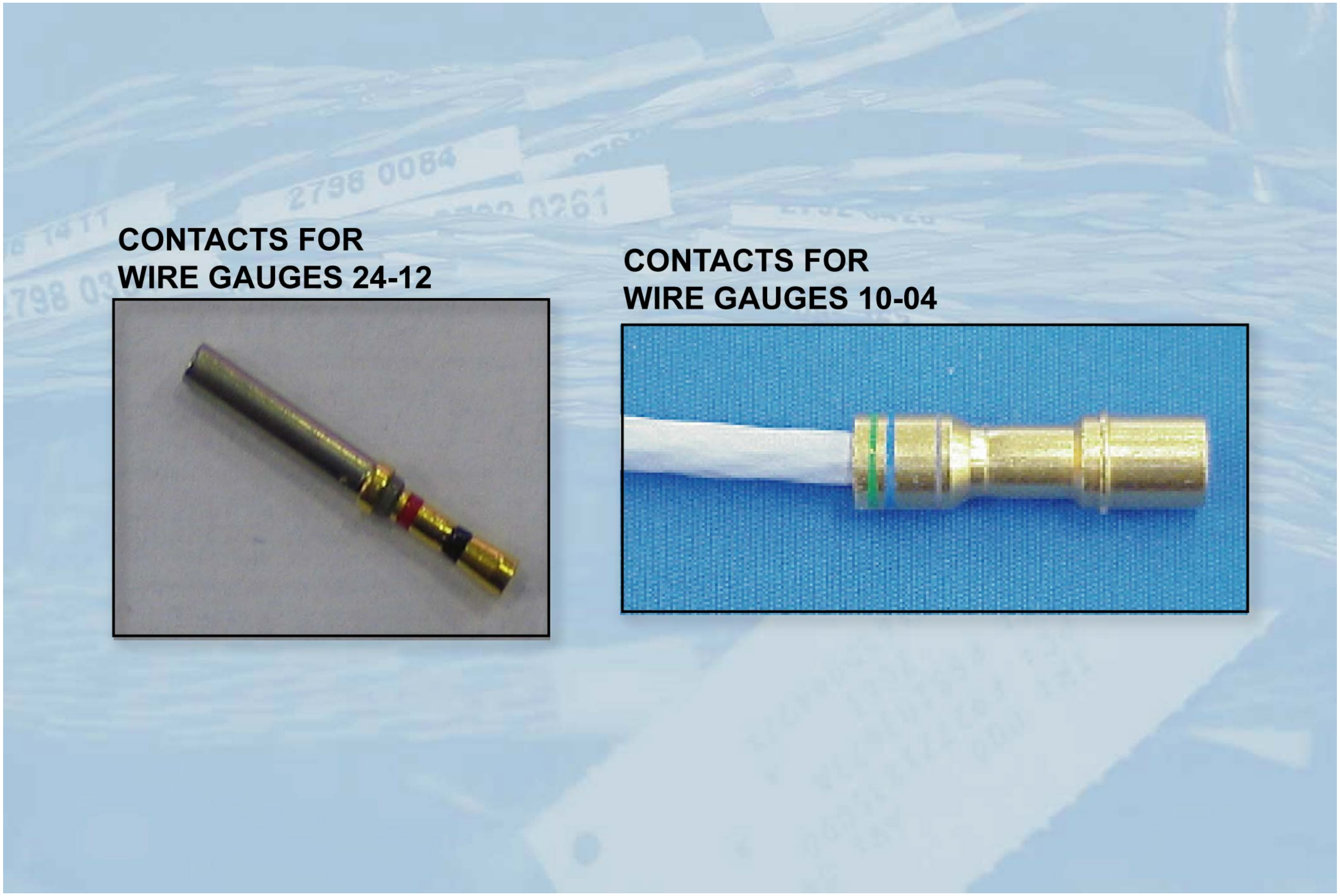
ALUMINUM WIRES - DISADVANTAGES OF ALUMINUM WIRES

OTHER WIRES

ALUMINUM WIRES (continued)

Construction of contacts for aluminum wires

Special contacts must be used for the new aluminum wires. They are designed to prevent any humidity contact with the aluminum core.
Two different types are available depending on the wire gauge.
One is used for Wire Gauges 24 to 12 and the second one for wire gauges 10 to 04



ALUMINUM WIRES - CONSTRUCTION OF CONTACTS FOR ALUMINUM WIRES

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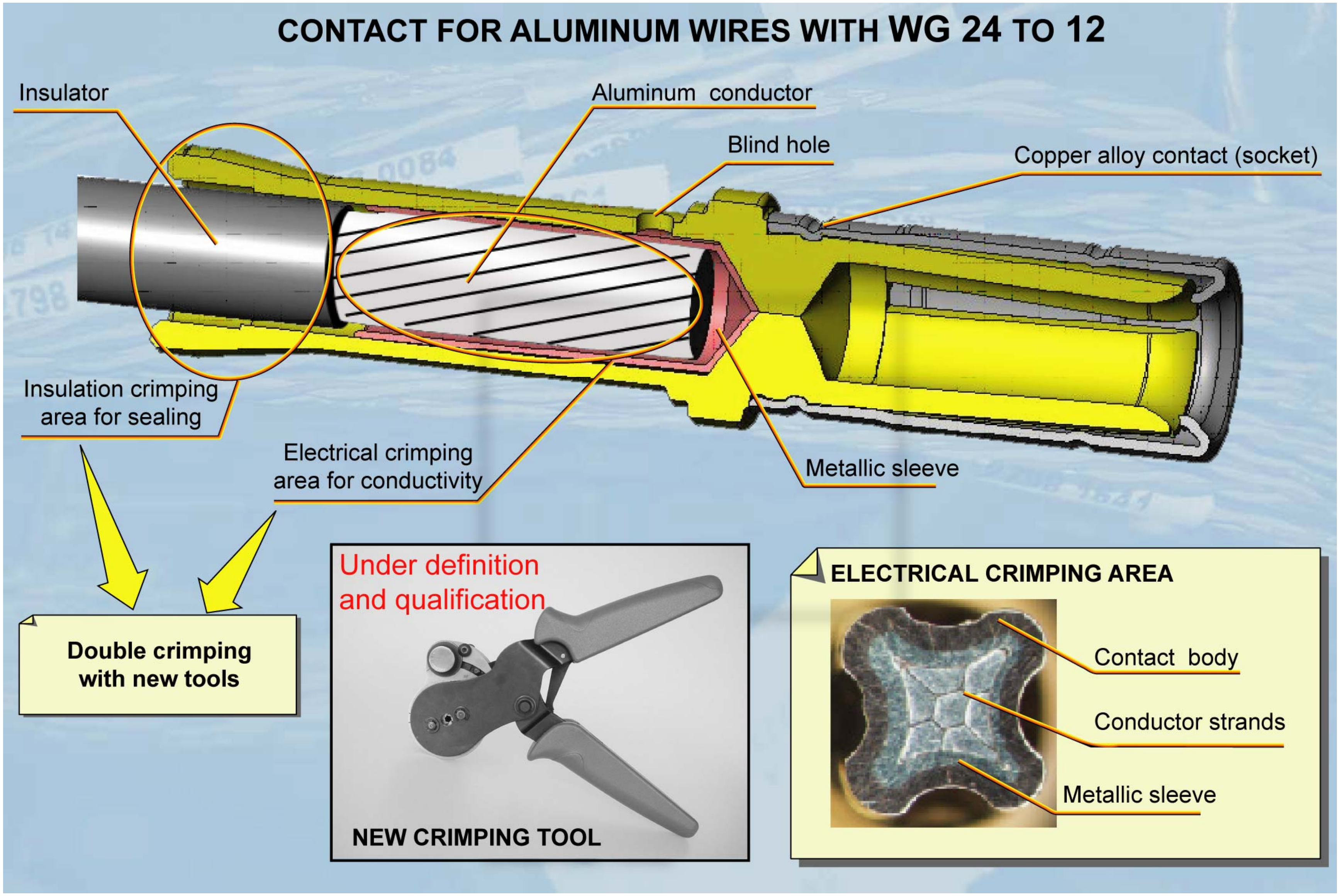
OTHER WIRES

ALUMINUM WIRES (continued)

Contacts for AWG 24 to 12

The contacts for aluminum Wire Gauges 24 to 12 have an additional crimping area for the wire insulation to guarantee the sealing.
The electrical crimping provides as usual the perfect conductivity between the core and the contact body.
A metallic sleeve divides the different materials, improves the conductivity and seals the blind hole, originally needed for contact manufacturing reasons.
Here you can see a cut view with all elements of the electrical crimping area, contact body, conductor strands and metallic sleeve. Note that due to the size of the metallic sleeve only one wire gauge fits into one contact type.
The crimping of the insulation seals the contacts. The insulation improves the breaking strength of the wire, giving additional stability to the wire.
An accurate double crimping is mandatory to get a reliable electrical connection and a stable wire installation.
Special crimping tools are needed to allow the double crimping. You can identify the crimping tools for aluminum wires with the purple color.



ALUMINUM WIRES - CONTACTS FOR AWG 24 TO 12

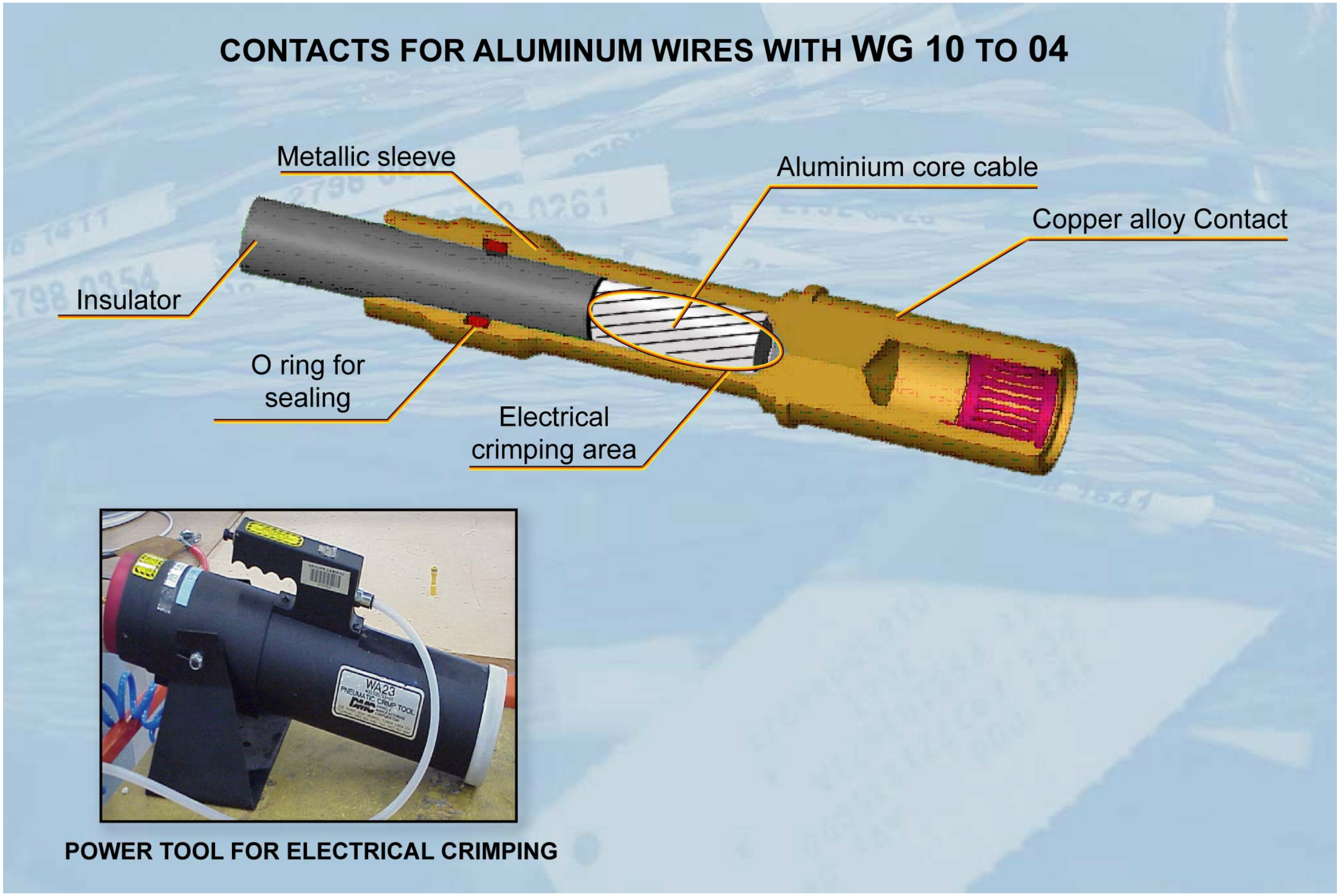
X8U08481 - X0332T0 - XM2046000000001

OTHER WIRES

ALUMINUM WIRES (continued)

Contacts for AWG 10 to 04

For Wire Gauges 10 to 04 a double crimping is not necessary.
Instead of crimping the insulation, an O-ring inside the contact makes the sealing to the wire insulation.
A perfect circular shape of the wire is necessary to get a 100% sealing by the O-ring.
The electrical crimping gives the perfect conductivity between the wire core and the contact body, improved by the metallic sleeve.
A power tool with pneumatic or hydraulic support is needed to get sufficient force for the electric crimping of the large wire gauges. You will know its use later.



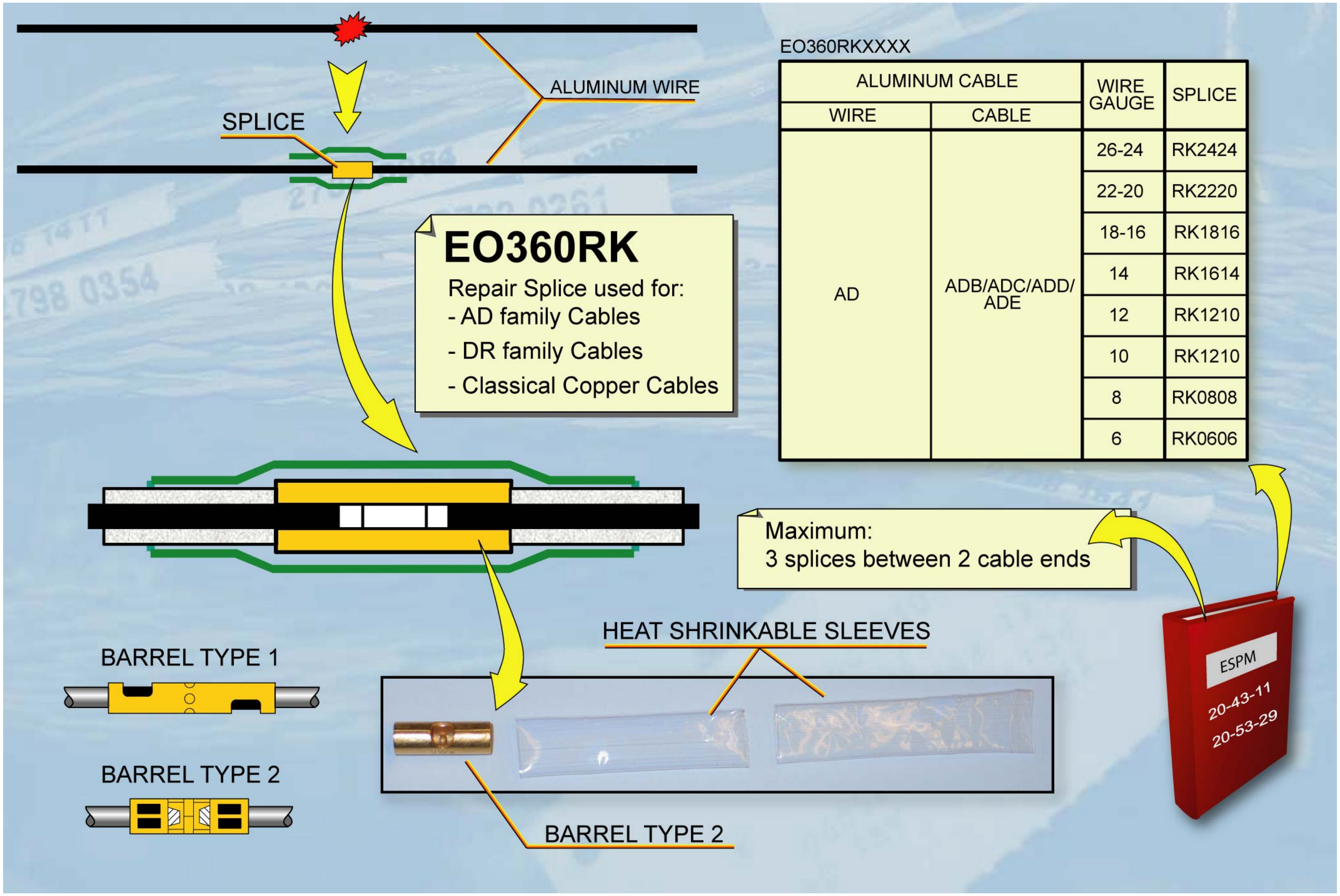
ALUMINUM WIRES - CONTACTS FOR AWG 10 TO 04

OTHER WIRES

ALUMINUM WIRES (continued)

Splices for aluminum CABLES

Splices used for the repair of aluminum cables are EO360RK type, which are high temperature butt splices, and can be chosen for the repair of splices for new DR family cables too.
Depending on the wire gauge, different splices are used as you can see on the table with two types of barrels. EO360RK splices must be sealed with two heat shrinkable sleeves.
This kind of splices is already used for the repair of classical copper cables. The connection procedure and rules are the same for all cable families as you can see in chapters 20-43-11 and 20-53-29 of the ESPM.
As a general rule, you can use only three splices on a same length of cable per section. That means 3 splices between 2 cable ends.



EO360RKXXXX

ALUMINUM CABLE		WIRE GAUGE	SPLICE
WIRE	CABLE		
AD	ADB/ADC/ADD/ADE	26-24	RK2424
		22-20	RK2220
		18-16	RK1816
		14	RK1614
		12	RK1210
		10	RK1210
		8	RK0808
		6	RK0606

ALUMINUM WIRES - SPLICES FOR ALUMINUM CABLES

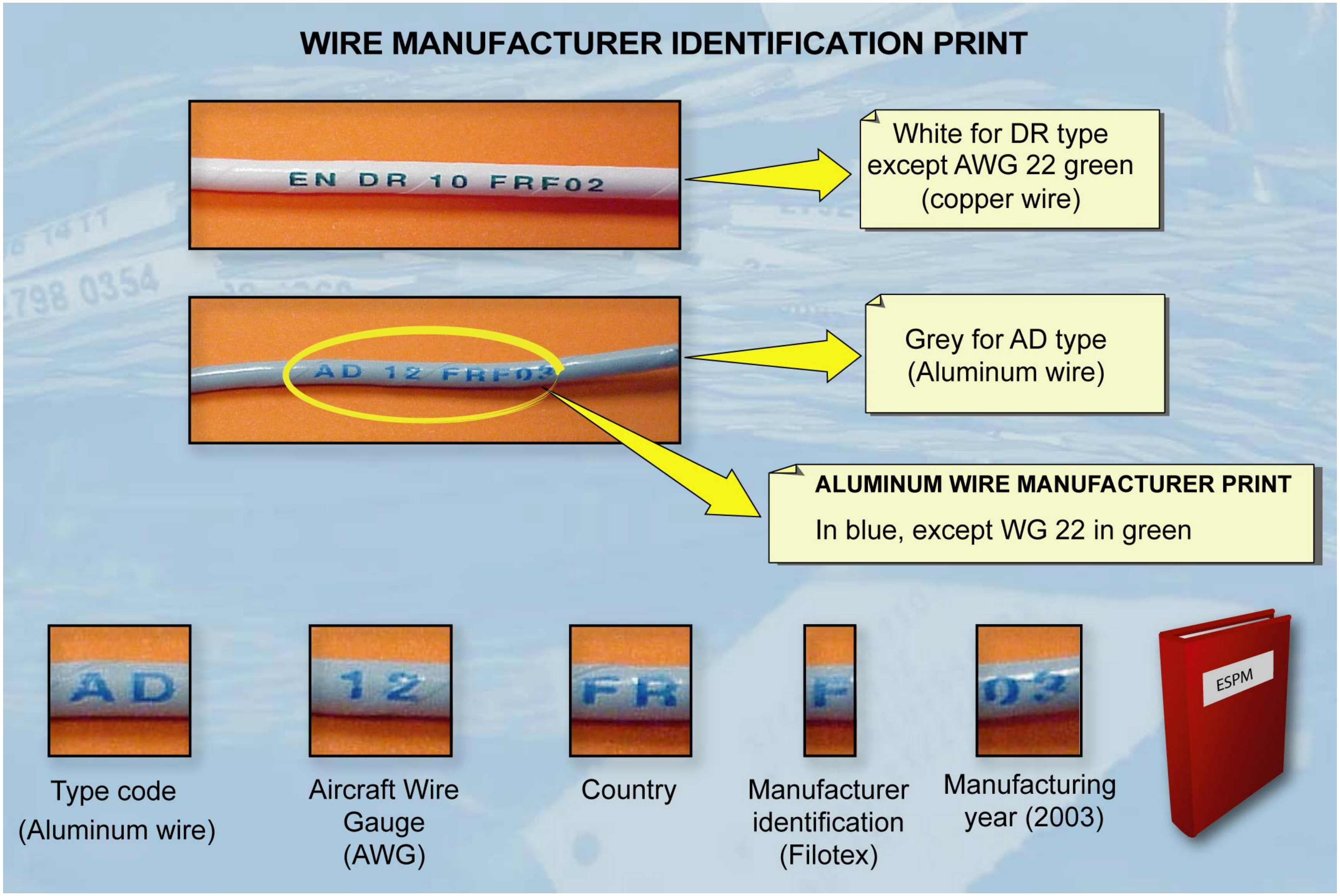
X8U08481 - X0332T0 - XM2046000000001

OTHER WIRES

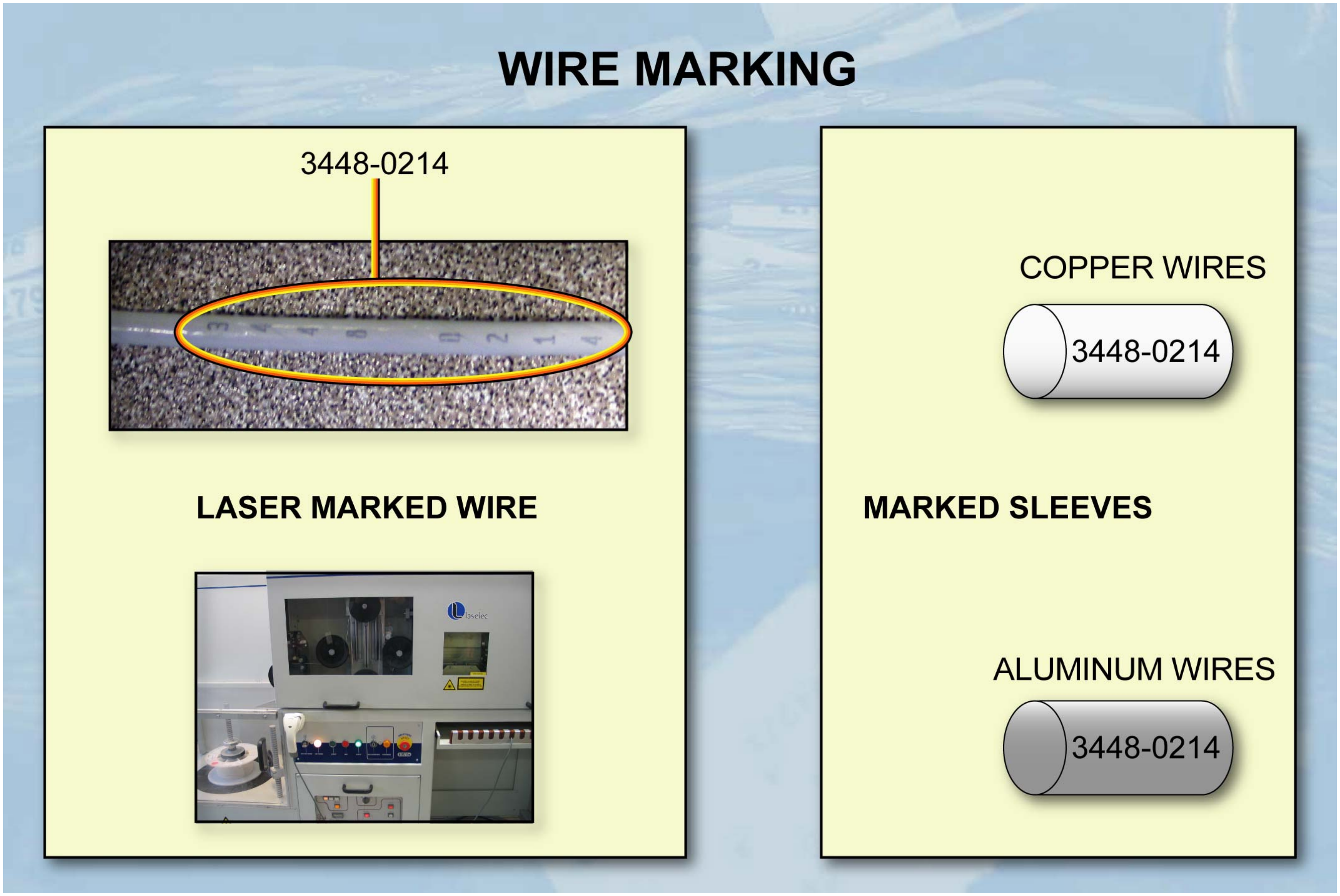
ALUMINUM WIRES (continued)

Wire and cable identification

As you have already seen, the wire conductor material could be identified by the color of the insulation.
The DR Type copper wire is white color, like all other aircraft wiring, except for the aircraft wire gauge 22 which has a green insulation color.
The aluminum wire, called AD Type has a grey insulation color.
As on all other wires also the aluminum wires have a manufacturer identification print.
The print is in blue, except on aircraft wire gauge 22 where it is in green. This corresponds to the green insulation color of the AWG 22 copper wires.
The manufacturer's identification print has five attributes.
The attribute most to the left, shows the wire type, AD in this example for the aluminum wire, followed by the aircraft wire gauge, here 12 for AWG 12.
The next two items identify the manufacturer of the wire by a country code, in this case with FR for France and its name code, here F for Filotex.
Finally the year of manufacturing is printed on the wire, here 03 for 2003.
You will find all these information in detail in the ESPM.
In addition to the manufacturers identification print it must be possible to identify the function of the wire in the aircraft.
An eight-digit number is used for this unique identification. You will learn more about this in module 3.
Wires and cables could be marked in two different ways: either by a black laser printing or if this is not possible or not allowed by printed sleeves. The sleeves for Cu wires are of white color and the sleeves for AL wires are of grey color.



ALUMINUM WIRES - WIRE AND CABLE IDENTIFICATION



ALUMINUM WIRES - WIRE AND CABLE IDENTIFICATION

X8U08481 - X0332T0 - XM204600000001

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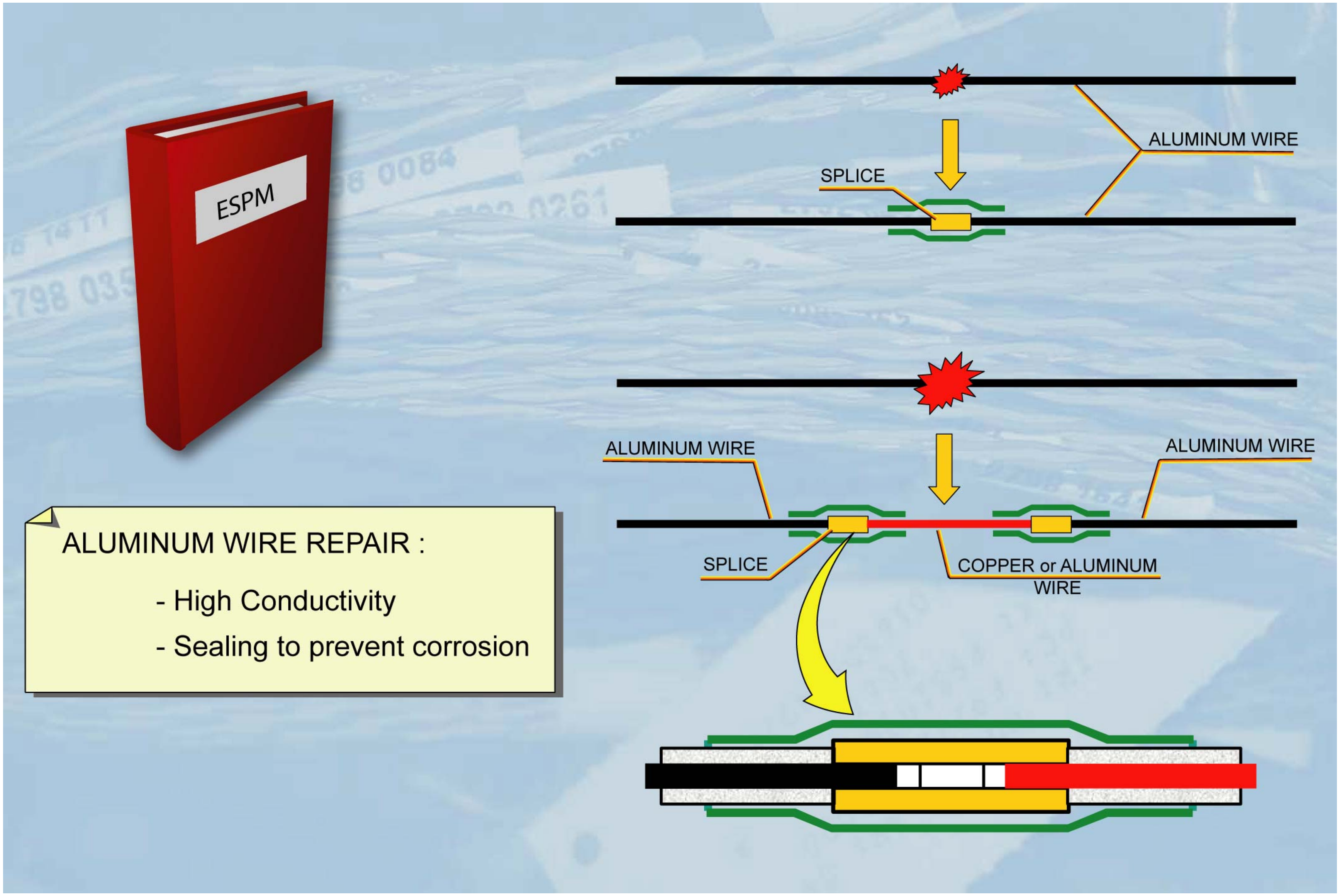
OTHER WIRES

ALUMINUM WIRES (continued)

Repair of ALuminum cables

Repair of aluminum wires follow basically the same rules as for copper wires. The procedures are documented in the ESPM and must be strictly followed.
Remember that in addition to the good conductivity, the sealing is very important to prevent any corrosion of the aluminum.
In this module, we will see that small damage like nicks, cuts and deep scratches could be repaired by inline splicing with one splice.
And damage in a larger area must be cut out and a new piece of copper or aluminum wire must be spliced in with the same wire gauge.

X8U08481 - X0332T0 - XM2046000000001



ALUMINUM WIRES - REPAIR OF ALUMINUM CABLES

OTHER WIRES

ALUMINUM WIRES (continued)

Stripping of AD cables wg 24 to 10

Semi-automatic tools as IDEAL Model 954, WIP 200 A and WIP 200 P, which are electro-pneumatic machines, can be used to strip AD wire gauge sizes 16 to 24. They can be used also for DR cables up to wire size 26.
Manual tools used to strip AD wires with gauges from 24 to 10 are STRIPMASTER type and can be easily identified by their purple handles.
This tool does a very precise stripping, so that nickel-plating damage is prevented, and it has a wire stop which guarantees the correct stripping length. This wire stop is mandatory to strip aluminum wires.
Two different stripper tools are available per supplier, one with stripping dies blade for 16 to 24 gauges and one with stripping dies blade for 10 to 14 gauges.
Note that these stripping dies blades can also be used for the DR type copper wires; therefore you can find a die for wire gauge 26 also, which is not used for aluminum wires. Stripping hand tools for DR wires have green handles.
For the stripping, you must insert the wire into the related gauge and push it against the wire stop to obtain the correct stripping length.
During stripping you must hold the wire perpendicular to the blades and parallel to the clamping jaws.
When you have reached the correct position you can strip the wire by activating the pliers.

SEMI-AUTOMATIC STRIPPING TOOLS

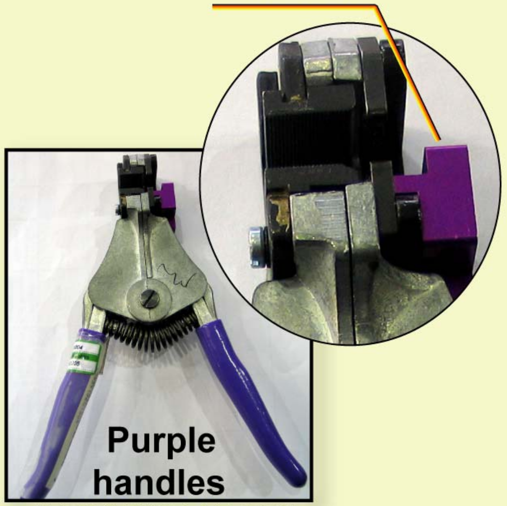
IDEAL - STRIPMASTER

Complete tool number	Stripping dies	Color of handles	Cable clamping jaws N°	Wire stop	Cable size AWG
45-2824-9	45-2824-1	Purple	LB 731	45-2824-5	24 to 16
45-2825-9	45-2825-1	Purple	LB 730	45-2825-5	14 to 10

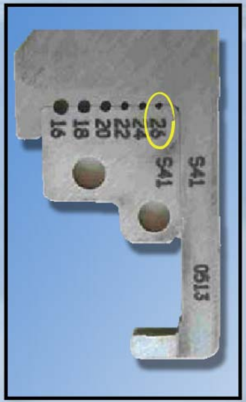
DAVUM WIP - STRIPMASTER

Complete tool number	Stripping dies	Color of handles	Cable clamping jaws N°	Wire stop	Cable size AWG
TMC-PCW3BT/AD1	TMC-W3	Purple	TMC-MP 3	TMC-BT/ AD1	24 to 16
TMC-PCW4BT/AD2	TMC-W4	Purple	TMC-MP 4	TMC-BT/ AD2	14 to 10

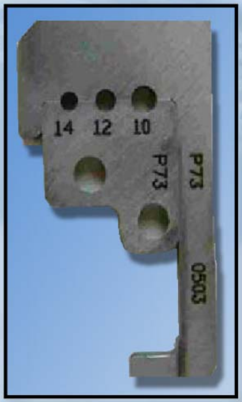
MANUAL STRIPPING TOOL
for AD wires



STRIPMASTER TOOL



STRIPPING DIES BLADE
FOR WG 16 TO 24



STRIPPING DIES BLADE
FOR WG 10 TO 14

Same blades are also used to strip DR type wires

ALUMINUM WIRES - STRIPPING OF AD CABLES WG 24 TO 10

X8U08481 - X0332T0 - XM2046000000001

ALUMINUM WIRES - STRIPPING OF AD CABLES WG 24 TO 10

X8U08481 - X0332T0 - XM2046000000001

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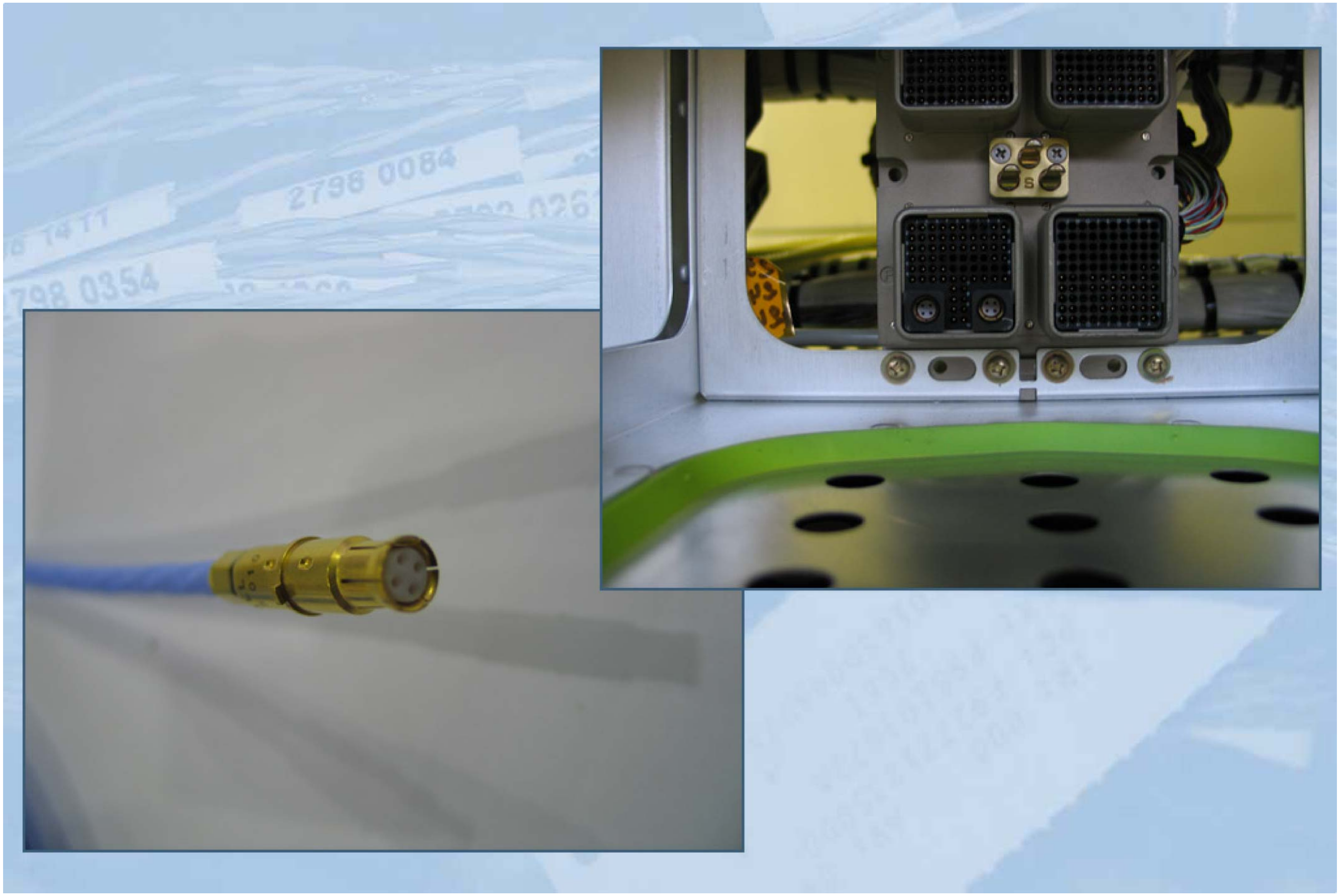
OTHER WIRES

QUADRAX WIRES

Now, let's have a look on Quadrax technology.



QUADRAX WIRES

X8U08481 - X0332T0 - XM2046000000001

OTHER WIRES

QUADRAX WIRES (continued)

Task of quad cables

Quad cables are used in modern commercial aircraft to transport data of the high speed Ethernet.
In other aircraft types you also may find quad cables in cabin data communication and entertainment systems, for example, in the aircraft Information Network System (AINS) and Cabin Information Network System (CINS) of the A340-500/600.
In the Ethernet Network the quad cables guarantee failure free data transmission with up to 100 Mega bits per second over a distance of up to 100 meters between a very high number of users.
Quad cables are usually delivered as complete harnesses.
One harness is composed of a shielded quad cable with four internal copper wires and a contact on each end.
The contact has either pins or sockets.
For repair and modifications, separated quad cables and individual contacts are available.
In the Avionics Data Communication Network (ADCN), all components communicate in a full duplex operation, because two wires of quad cable transport the data in one direction, called for example the transmission and the other two wires transport the data in the opposite direction, called the reception.
The quad cable is also called star quad cable because the four wires inside the shield are arranged in a star format around a center filler wire.
In some Ethernet applications in the aviation industry, for example in Boeing aircraft, you also may find a so-called twinax cables.
A twinax cable only has one pair of wires and two fillers inside a shield. Therefore it only can transport data in one direction at a time, this is called half duplex operation.

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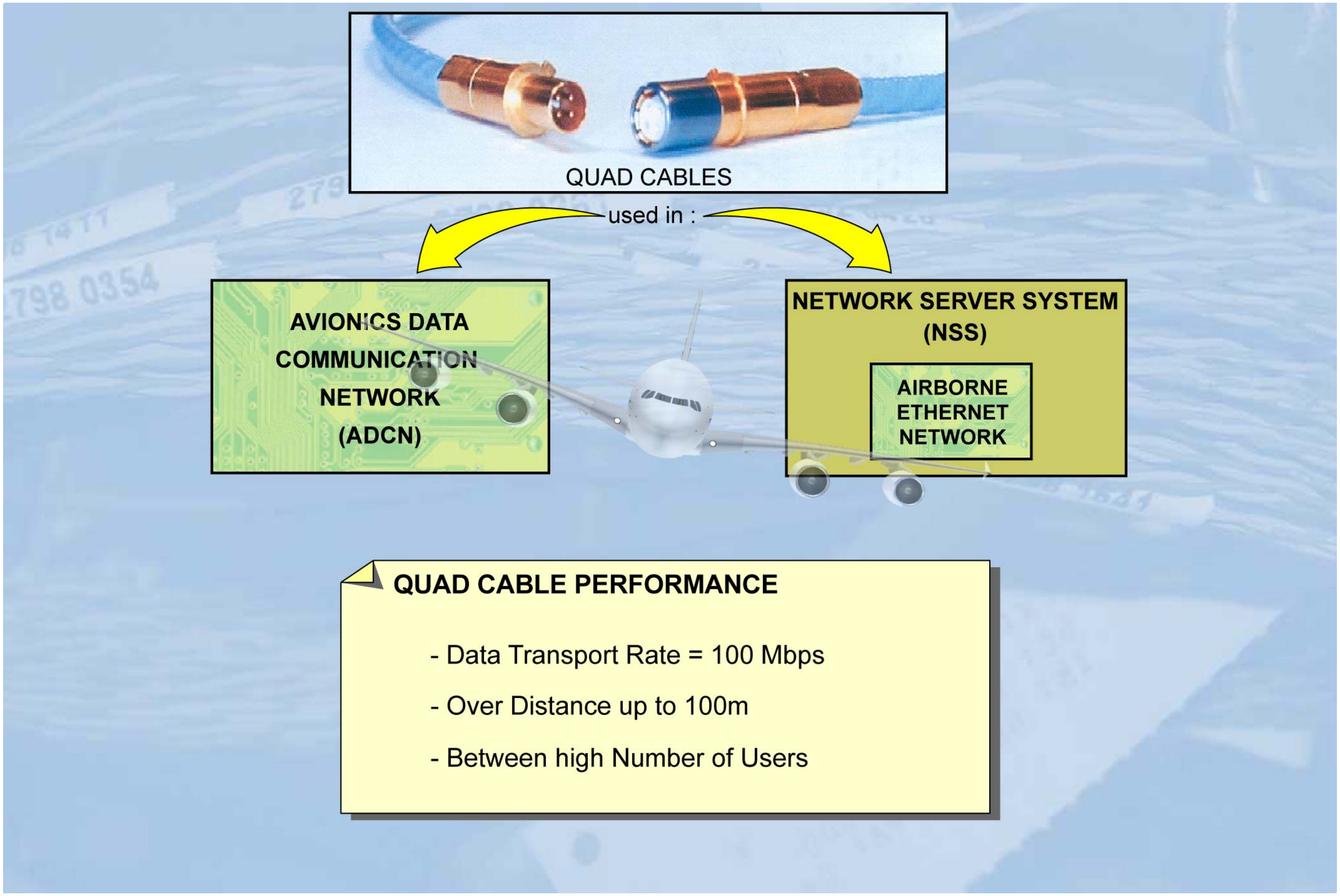
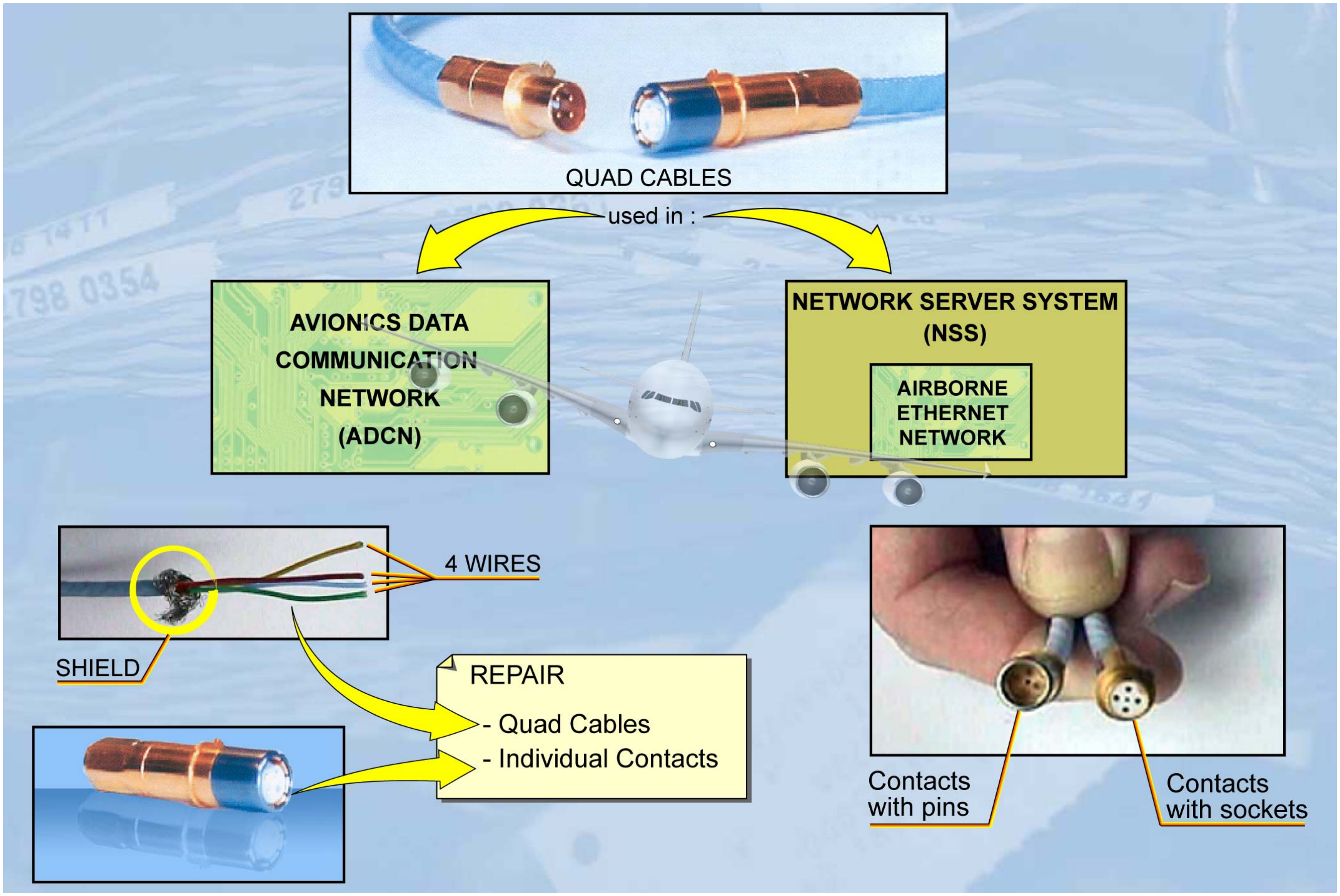
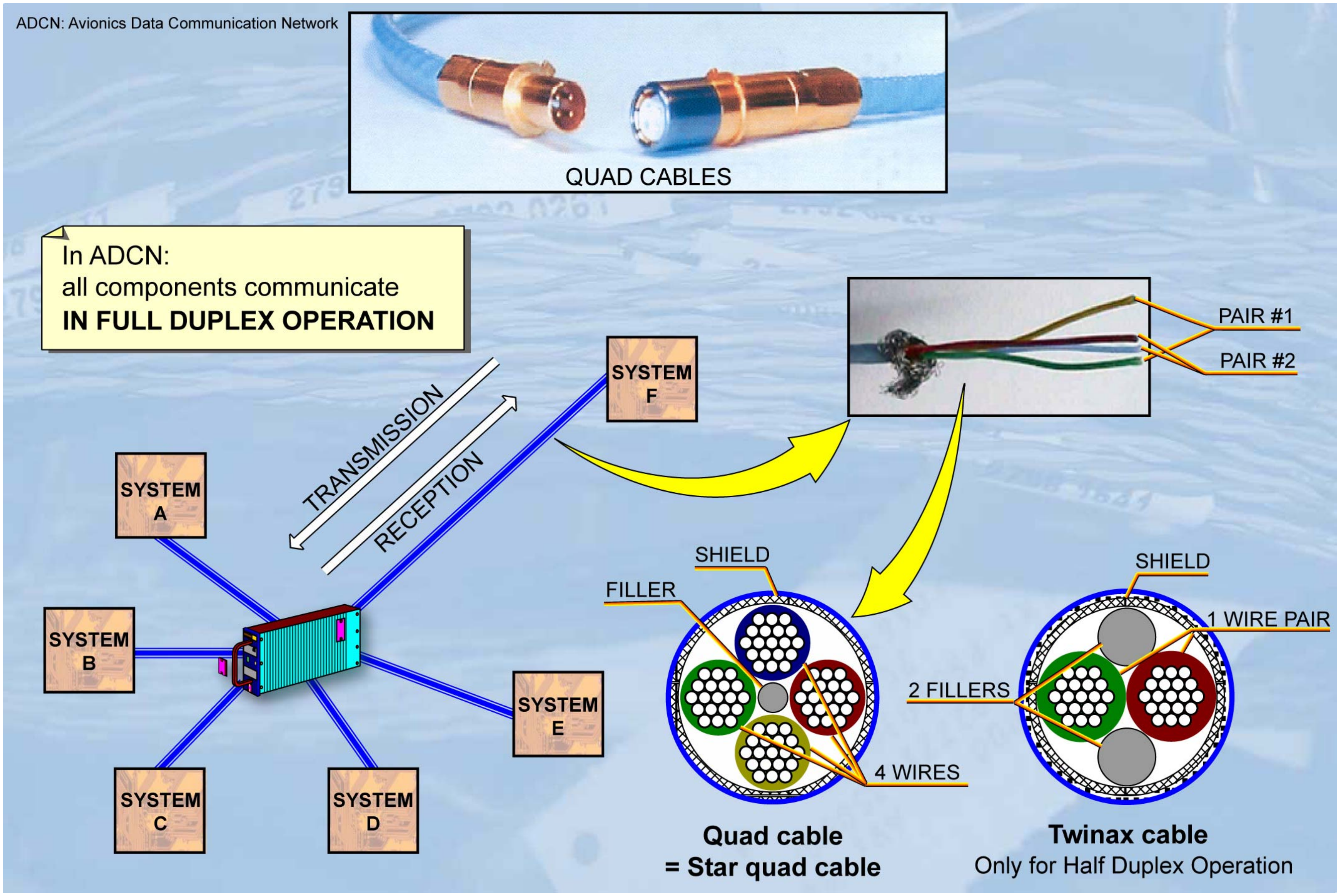


QUADRAX WIRES - TASK OF QUAD CABLES



QUADRAX WIRES - TASK OF QUAD CABLES



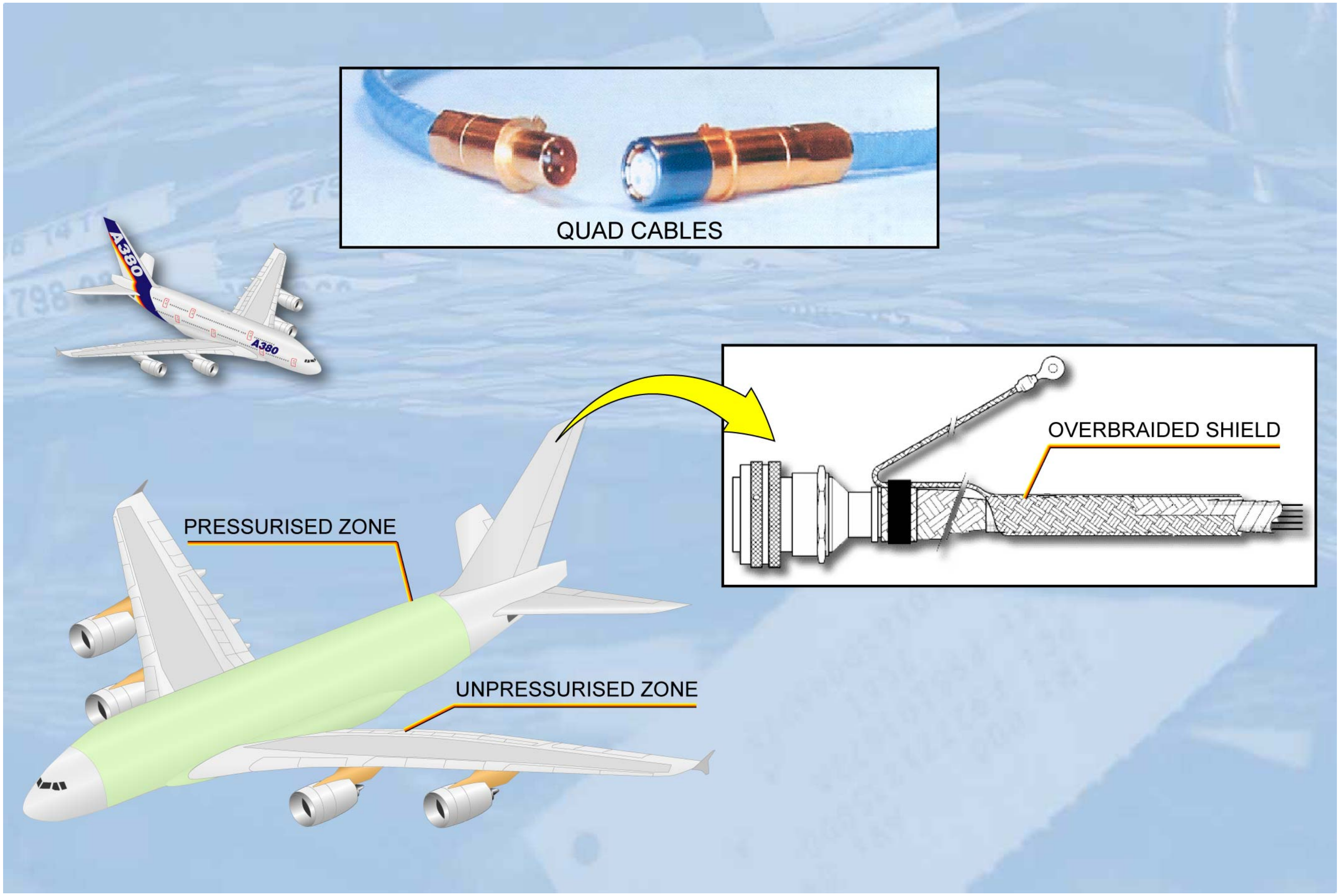
QUADRAX WIRES - TASK OF QUAD CABLES

OTHER WIRES

QUADRAX WIRES (continued)

Application

In the A380 you will find Quad cables harnesses primarily installed in the pressurized area of the fuselage.
If quad cables are installed in unpressurized areas like the wings, they are installed inside an overbraided shield to prevent electro magnetic interference during lightning strikes.



QUADRAX WIRES - APPLICATION

X8U08481 - X0332T0 - XM2046000000001

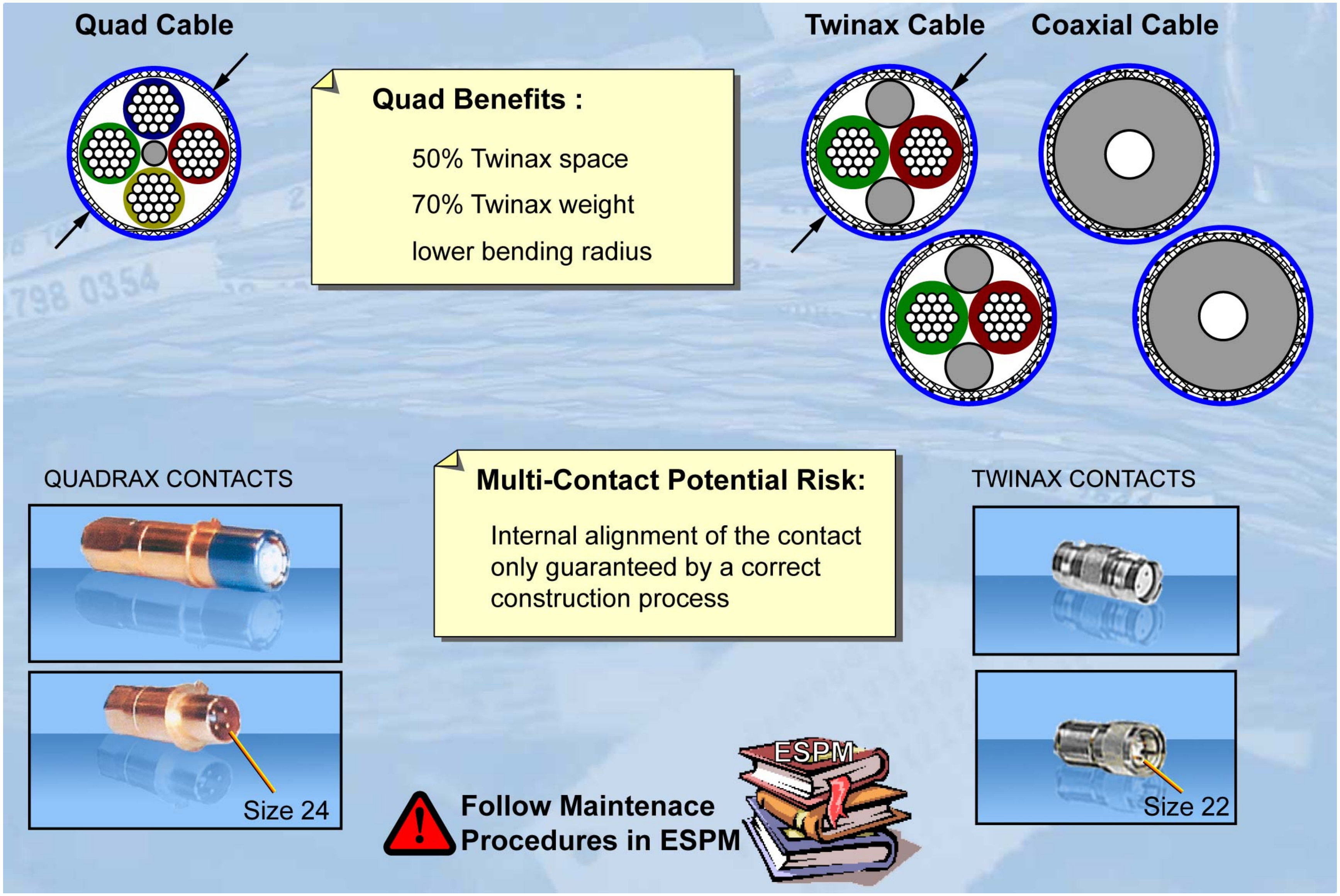
OTHER WIRES

QUADRAX WIRES (continued)

Benefits and risks of quad cables

The use of quad cables has many benefits over twinax cables and coaxial cables which you also can find in Ethernet Networks.
Because of the full duplex capability, one quad cable has the same function as two twinax or coaxial cables.
As the contacts and cables have the same diameter, quad cables and contacts need only 50% of the space and about 70% of the weight of twinax cables and contacts.
In addition, cable installation should be easier because of the lower bending radius of the quad cable.
On the other hand, the use of quadrax contacts as any other kind of multi-contact has a potential related risk:
- the internal alignment of the contact can only be guaranteed by a correct construction process,
- and a slightly more fragile size of 24 contact pins.

To minimize these risks you must follow the maintenance procedures of the ESPM.



QUADRAX WIRES - BENEFITS AND RISKS OF QUAD CABLES

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OTHER WIRES

QUADRAX WIRES (continued)

Quad cable construction

A complete quadrax harness for the ethernet data transmission has 2 contacts with either pins or sockets and the quad cable. In this topic we will look at the quad cable in more detail.
The quad cable is specified in the ESPM as:
- type KB with the airbus standard ABS 0972.
- or type KD with the airbus standard ABS 1503. This last one is lighter and is used where the EMI are severe. KD 24 will be used more often instead of KB24 whatever the application and location.
Both quad cables have an outer diameter of about 5 mm and the following internal construction:
- four single stranded wires are uniformly twisted around a center filler,
- the individual wires are of AWG 24 and have a silver plated copper core,
- the individual wire insulation is color coded and made of FEP which stands for Fluorinated Ethylene Propylene,
- around all four wires you can find a protection tape,
- the shield is made of silver plated copper and the complete cable is insulated by a light blue FEP sheath which is suitable for UV Laser marking. The light blue color makes an easy identification in the aircraft.

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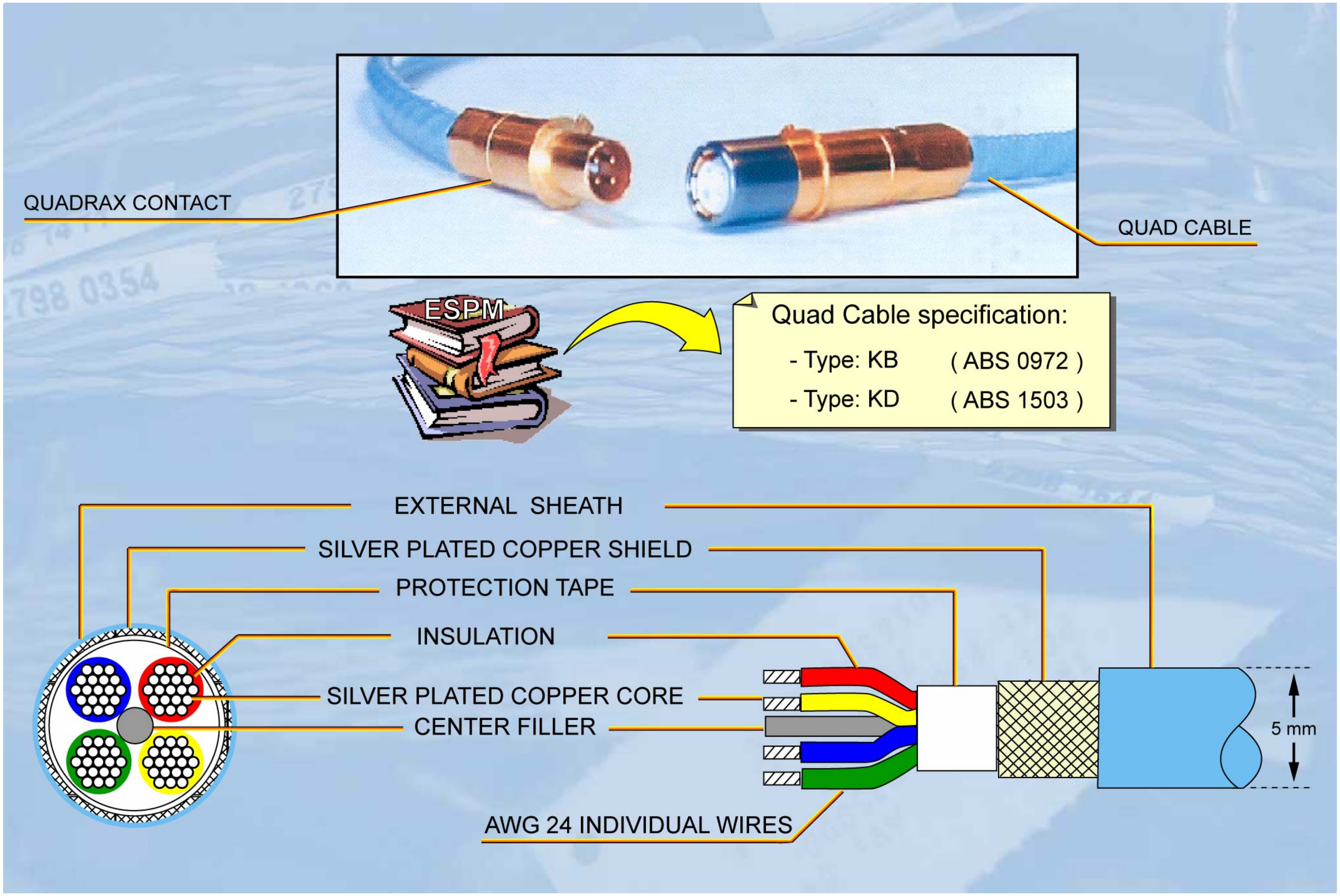

QUADRAX WIRES - QUAD CABLE CONSTRUCTION

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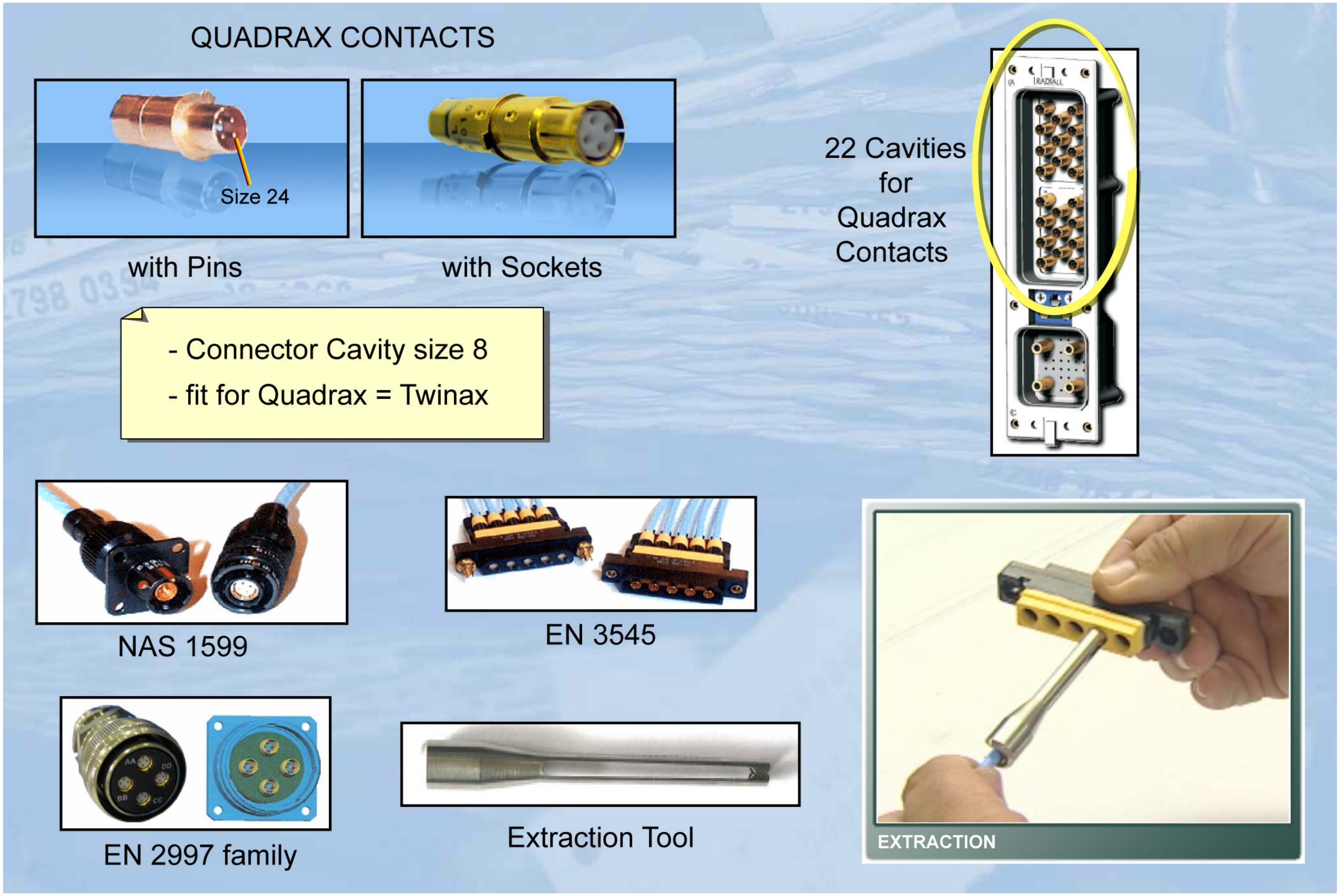
OTHER WIRES

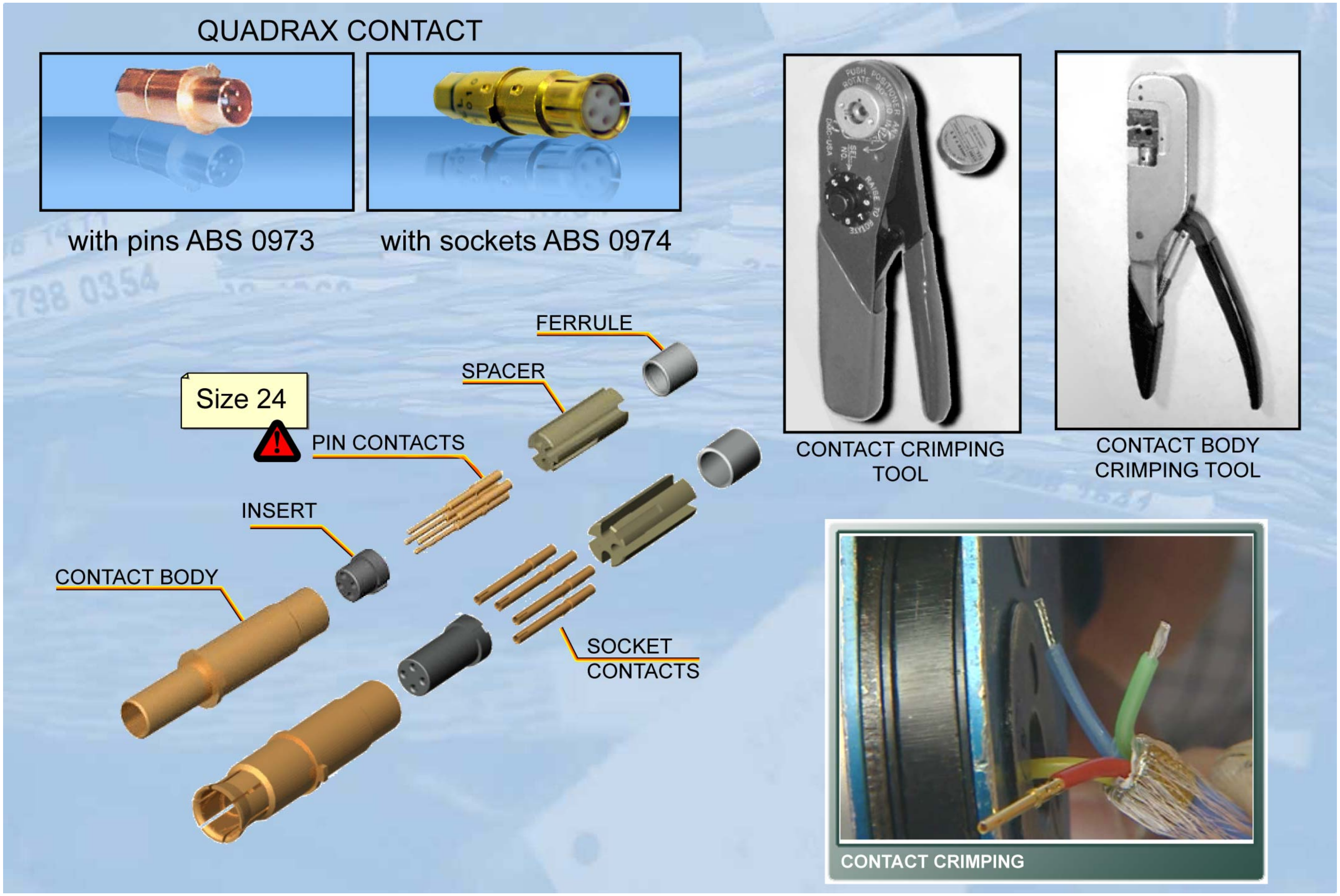
QUADRAX WIRES (continued)

Quadrax contact

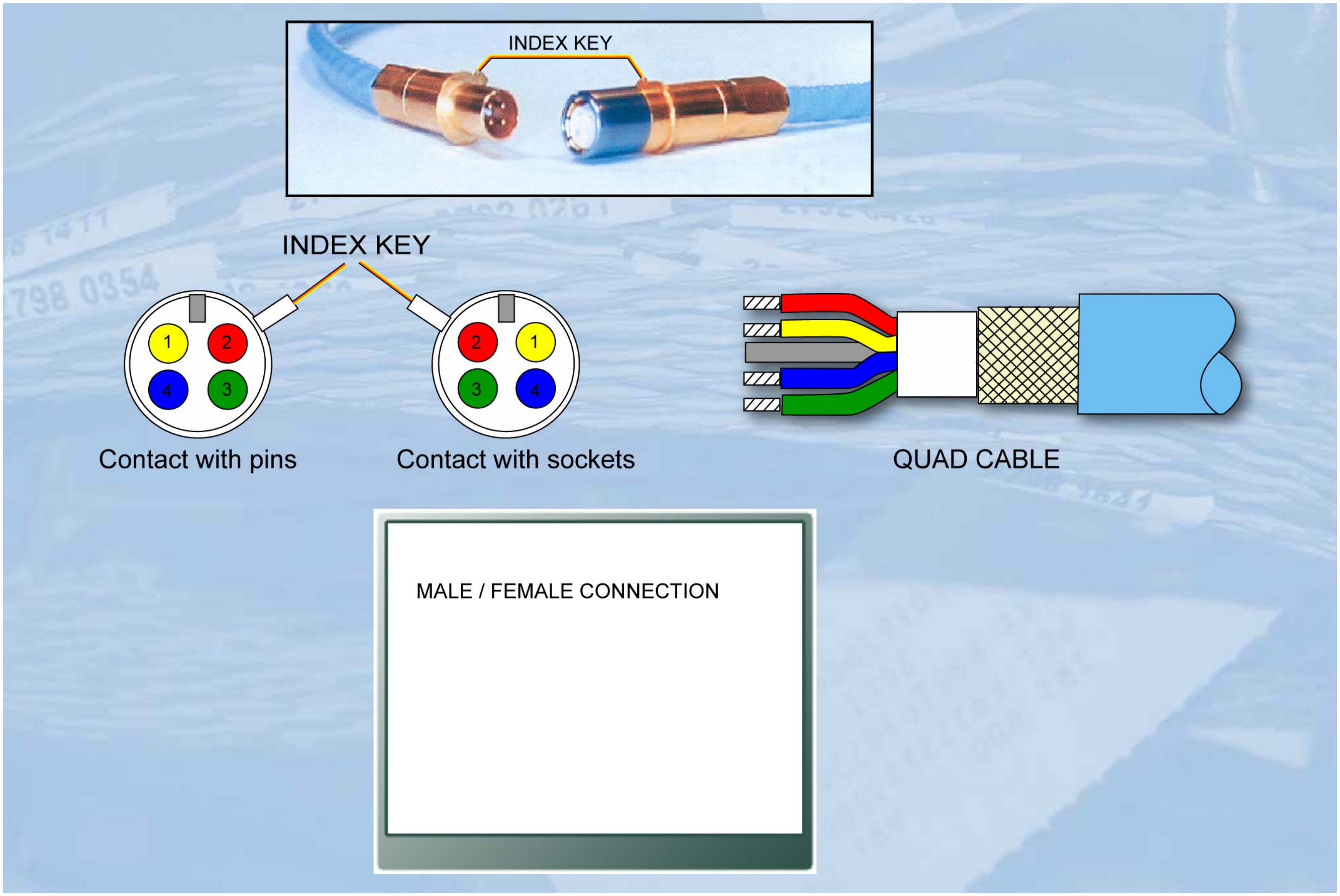


QUADRAX WIRES - QUADRAX CONTACT

X8U08481 - X0332T0 - XM2046000000001



QUADRAX WIRES - QUADRAX CONTACT



QUADRAX WIRES - QUADRAX CONTACT

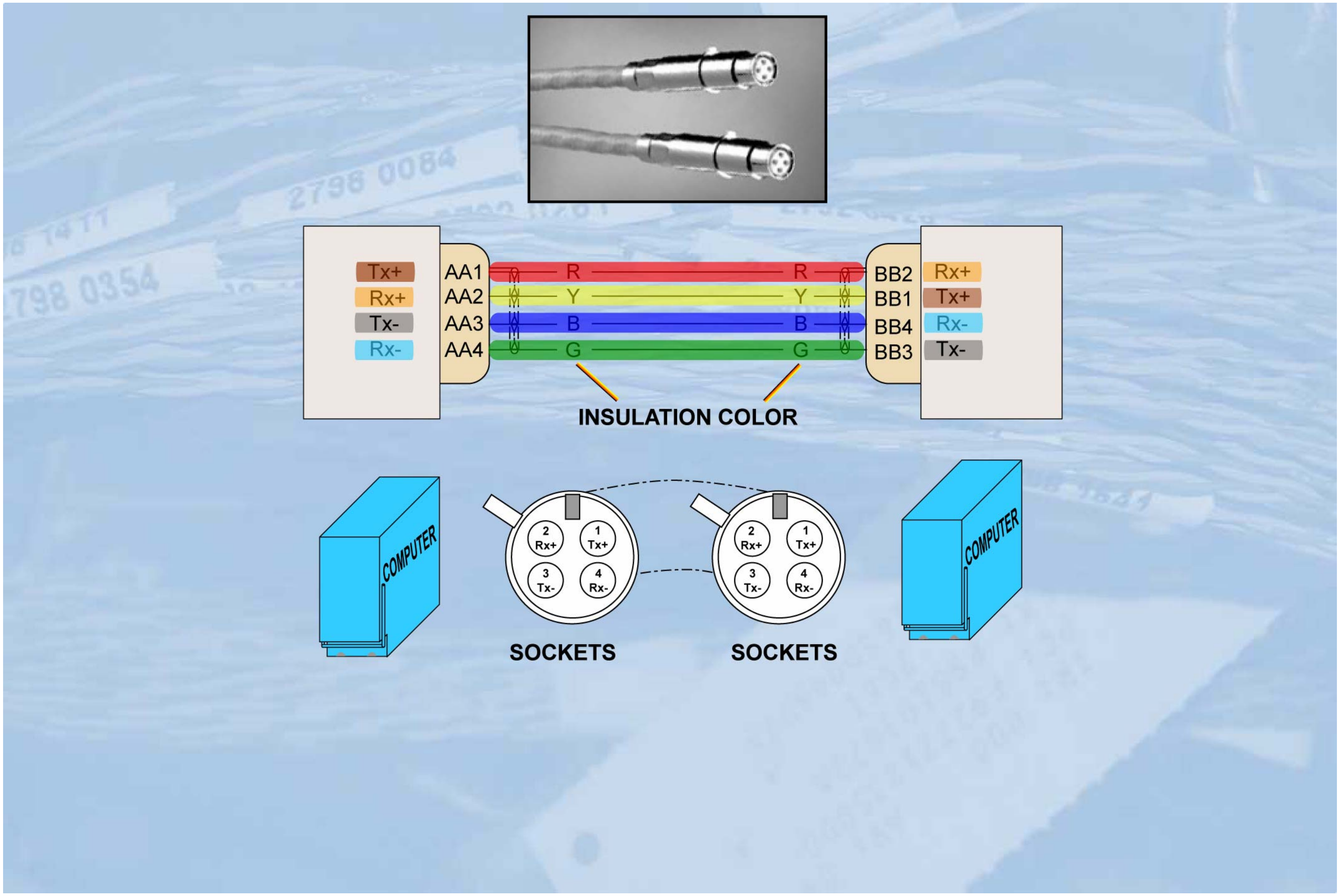
OTHER WIRES

QUADRAX WIRES (continued)

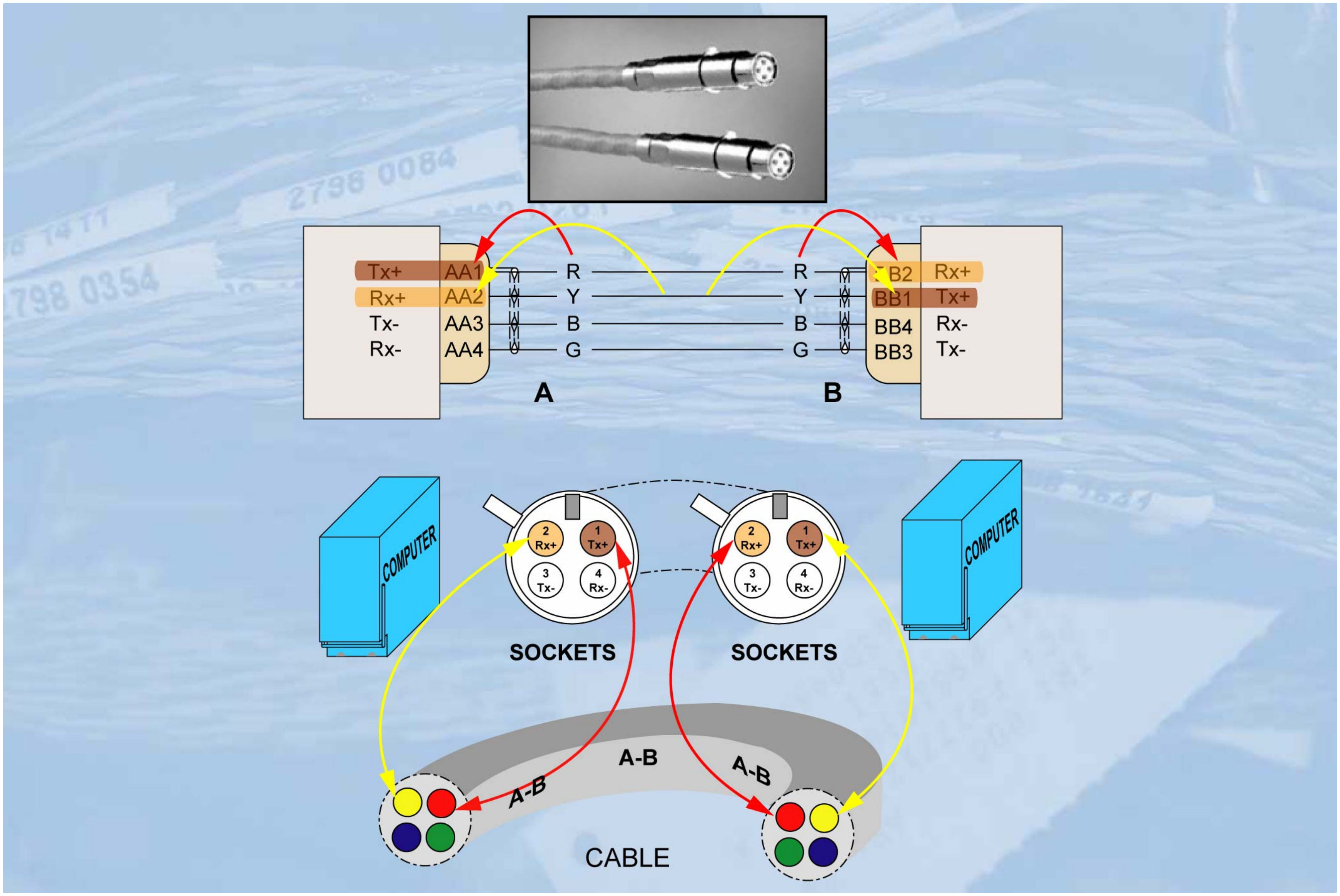
Quadrax harness

Each Quadrax harness is composed of a cable and two contacts, which either have pins or sockets.
You can now compare the buildup of the quadrax harness in comparison to the presentation in a wiring diagram.
In this example two computers are connected to each other by one harness equipped with two contacts with sockets.
To prevent any confusion, all quad cables are printed every 300mm with the letters A and B, what always agrees with the direction shown in the wiring.
When the connection between the two computers is too long for one harness, a disconnect is added. A disconnect has always one contact with sockets, here as the plug on the left side, and one contact with pins, here the receptacle on the right side.
The result is that one harness has two contacts with sockets, as in our earlier example, and that the other harness has a contact with sockets on the B side of the cable and a contact with pins on the A side.
As the four wires inside the quad cable have always the same sequence, we have now the situation where for example the red wire is connected to pin 2 of both contacts on the right harness, but the red wire on the left harness is connected to pin one in the left contact and to pin 2 in the right contact.
This is called a crossover connection, whereas the right harness has a straight connection.
Here you can see a connection between two computers, which has four quadrax harnesses and three disconnects.
Having a closer look to the harness types you can find one crossover connection and three straight connections.
The conclusion is that in all quadrax data connections you will always find an odd number of crossover connections between two computers, independent of the number of disconnects.

The protection against electro magnetic interferences, called EMI protection in short, is done by the cable shield which is crimped to the contact body. You will learn this in more detail in the Maintenance Activities module.
In a disconnect the contact bodys are connected to each other so a so called 360 degrees shielding of the complete harness between the receiver and the transmitter is guaranteed.
Inside the computers the shield is grounded by approved techniques like the grounding belt of an ARINC 600 connector.



QUADRAX WIRES - QUADRAX HARNESS



QUADRAX WIRES - QUADRAX HARNESS

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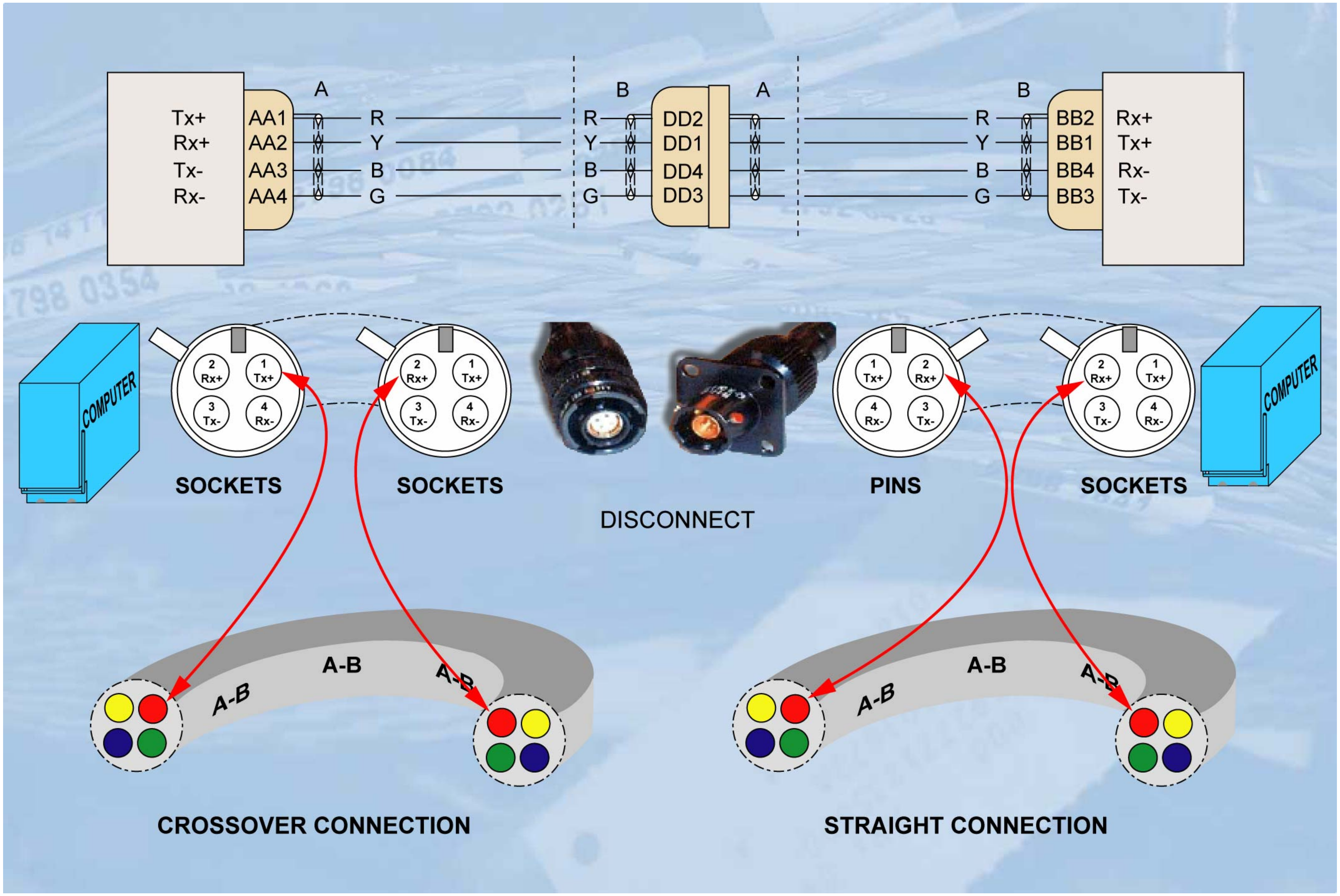
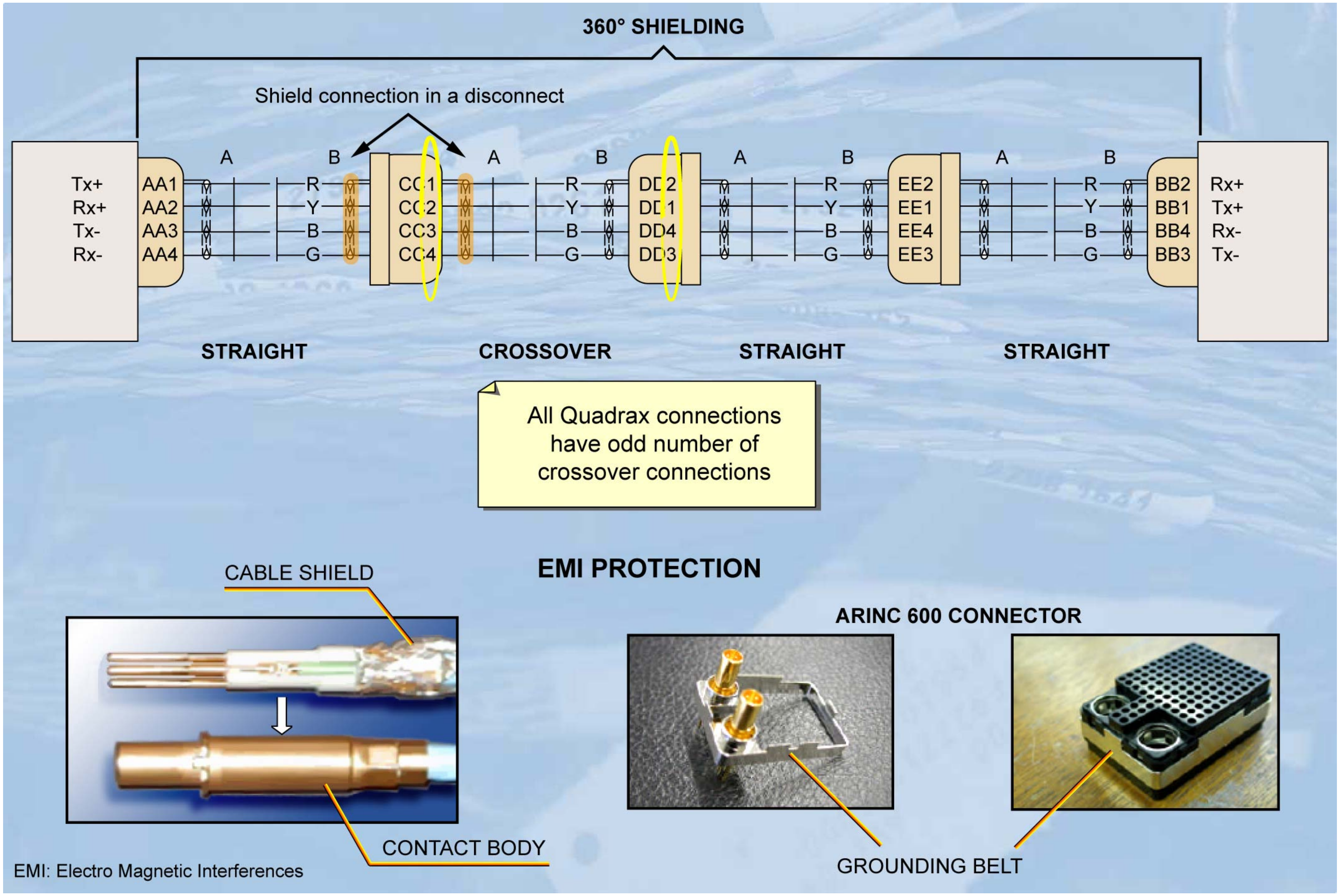


QUADRAX WIRES - QUADRAX HARNESS



QUADRAX WIRES - QUADRAX HARNESS

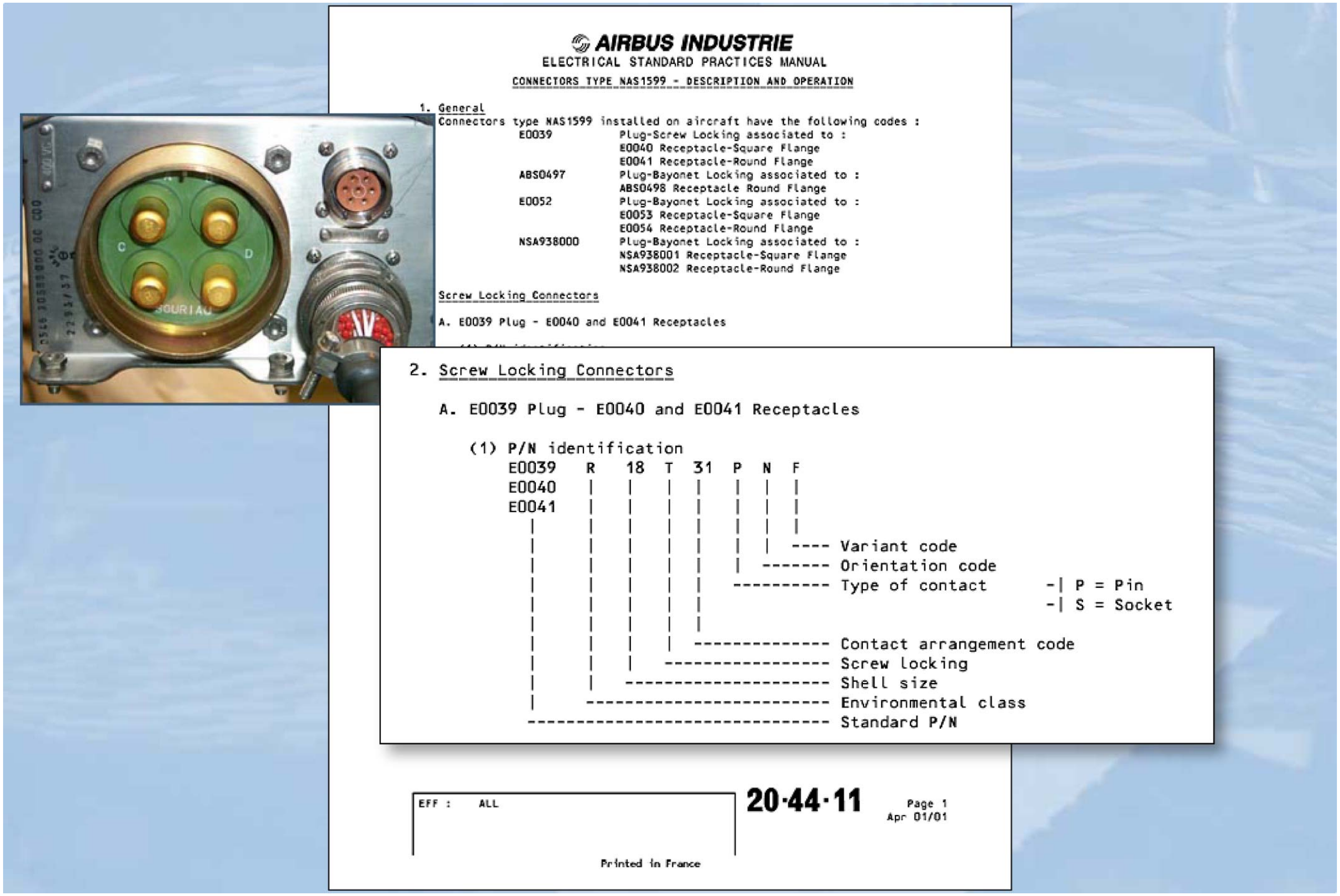
X8U08481 - X0332T0 - XM2046000000001

QUADRAX WIRES - QUADRAX HARNESS

GENERAL TYPES AND IDENTIFICATION

CIRCULAR CONNECTORS

Example of Part Number (PN) identification,
for screw locking connectors.
In the Part Number identification (PN) you have the standard part number,
the environment class,
the shell size,
the screw locking code,
the contact arrangement code,
information about the type of contact,
the orientation code,
and the variant code.
Example of contact arrangement.
The contact arrangement code gives information on the size
The contact arrangement code gives information on the size and number of contacts.
For more information on the PN construction, you can refer to the Standard Manual (SM).
Example of contact arrangements for a type of connector. In a same connector, you can have different contacts sizes. For example, you have here two contacts size 16 and thirty-seven contacts size 20.
An arrow shows the positioning key of the connector.
At each end of subject, 20-44-11 in this example, you will find a connection table that will give you the type of contact to use for the relevant connector.
For ASNE0039 in this example you see it is an NSA938151P or 152S contact.



AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

CONNECTORS TYPE NAS1599 - DESCRIPTION AND OPERATION

1. General

Connectors type NAS1599 installed on aircraft have the following codes :

E0039	Plug-Screw Locking associated to :
	E0040 Receptacle-Square Flange
	E0041 Receptacle-Round Flange
ABS0497	Plug-Bayonet Locking associated to :
	ABS0498 Receptacle Round Flange
E0052	Plug-Bayonet Locking associated to :
	E0053 Receptacle-Square Flange
	E0054 Receptacle-Round Flange
NSA938000	Plug-Bayonet Locking associated to :
	NSA938001 Receptacle-Square Flange
	NSA938002 Receptacle-Round Flange

Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(1) P/N identification

```
E0039   R   18   T   31   P   N   F
E0040   |   |    |   |    |   |   |
E0041   |   |    |   |    |   |   |
  |     |   |    |   |    |   |   |
  |     |   |    |   |    |   |   ---- Variant code
  |     |   |    |   |    |   ------- Orientation code
  |     |   |    |   |    ---------- Type of contact    -| P = Pin
  |     |   |    |   |                                   -| S = Socket
  |     |   |    |   |
  |     |   |    |   -------------- Contact arrangement code
  |     |   |    ----------------- Screw locking
  |     |   -------------------- Shell size
  |     ----------------------- Environmental class
  ----------------------------- Standard P/N
```

EFF : ALL

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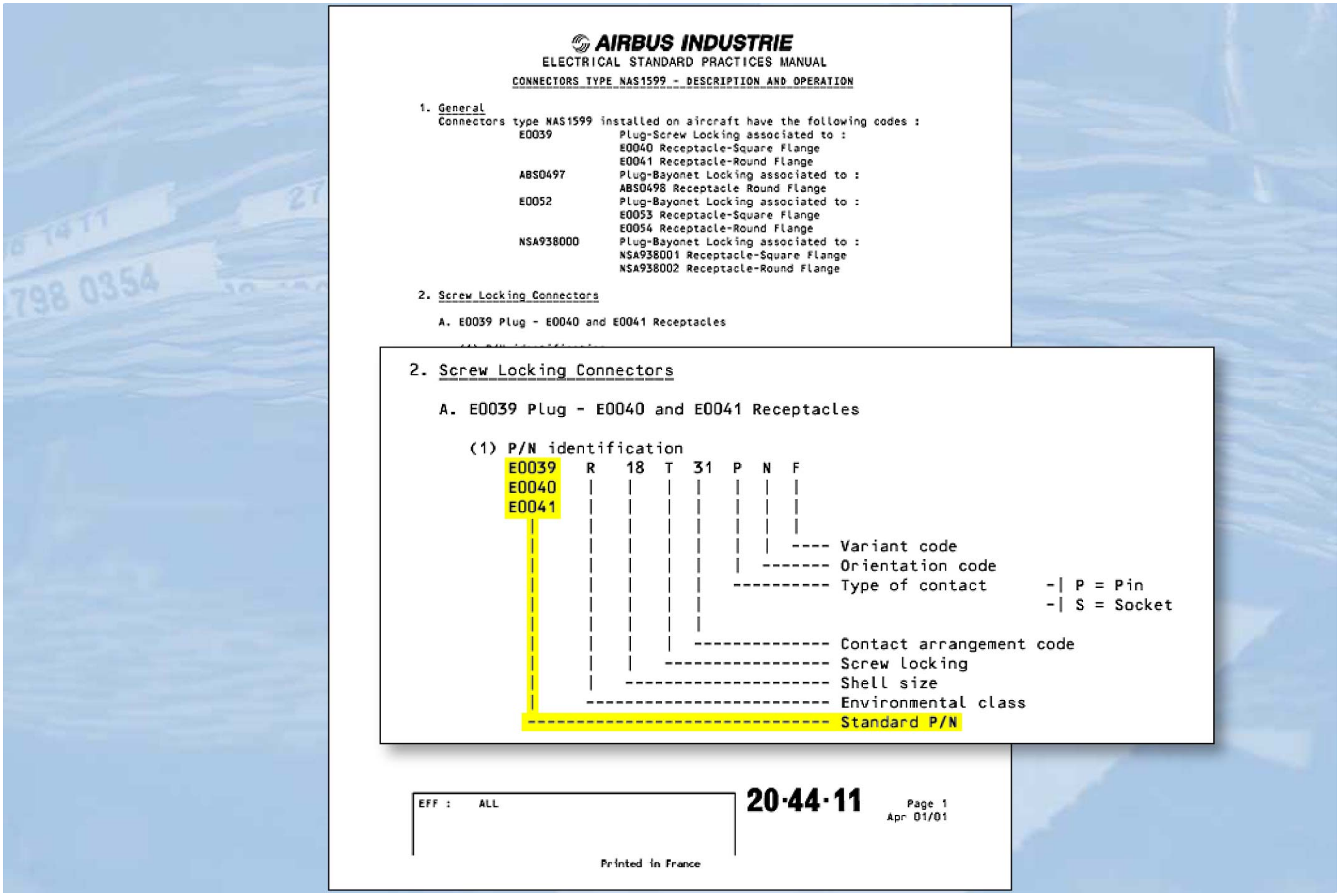
CIRCULAR CONNECTORS



AIRBUS INDUSTRIE
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ABS0497	Plug-Bayonet Locking associated to : ABS0498 Receptacle Round Flange
E0052	Plug-Bayonet Locking associated to : E0053 Receptacle-Square Flange E0054 Receptacle-Round Flange
NSA938000	Plug-Bayonet Locking associated to : NSA938001 Receptacle-Square Flange NSA938002 Receptacle-Round Flange

2. Screw Locking Connectors

   A. E0039 Plug - E0040 and E0041 Receptacles

2. Screw Locking Connectors

   A. E0039 Plug - E0040 and E0041 Receptacles

      (1) P/N identification

```
E0039   R   18  T  31  P  N  F
E0040   |   |   |  |   |  |  |
E0041   |   |   |  |   |  |  |
  |     |   |   |  |   |  |  |
  |     |   |   |  |   |  |  ---- Variant code
  |     |   |   |  |   |  ------- Orientation code
  |     |   |   |  |   ---------- Type of contact      -| P = Pin
  |     |   |   |  |                                   -| S = Socket
  |     |   |   |  |
  |     |   |   |  -------------- Contact arrangement code
  |     |   |   ----------------- Screw locking
  |     |   --------------------- Shell size
  |     ------------------------- Environmental class
  ------------------------------- Standard P/N
```

EFF : ALL

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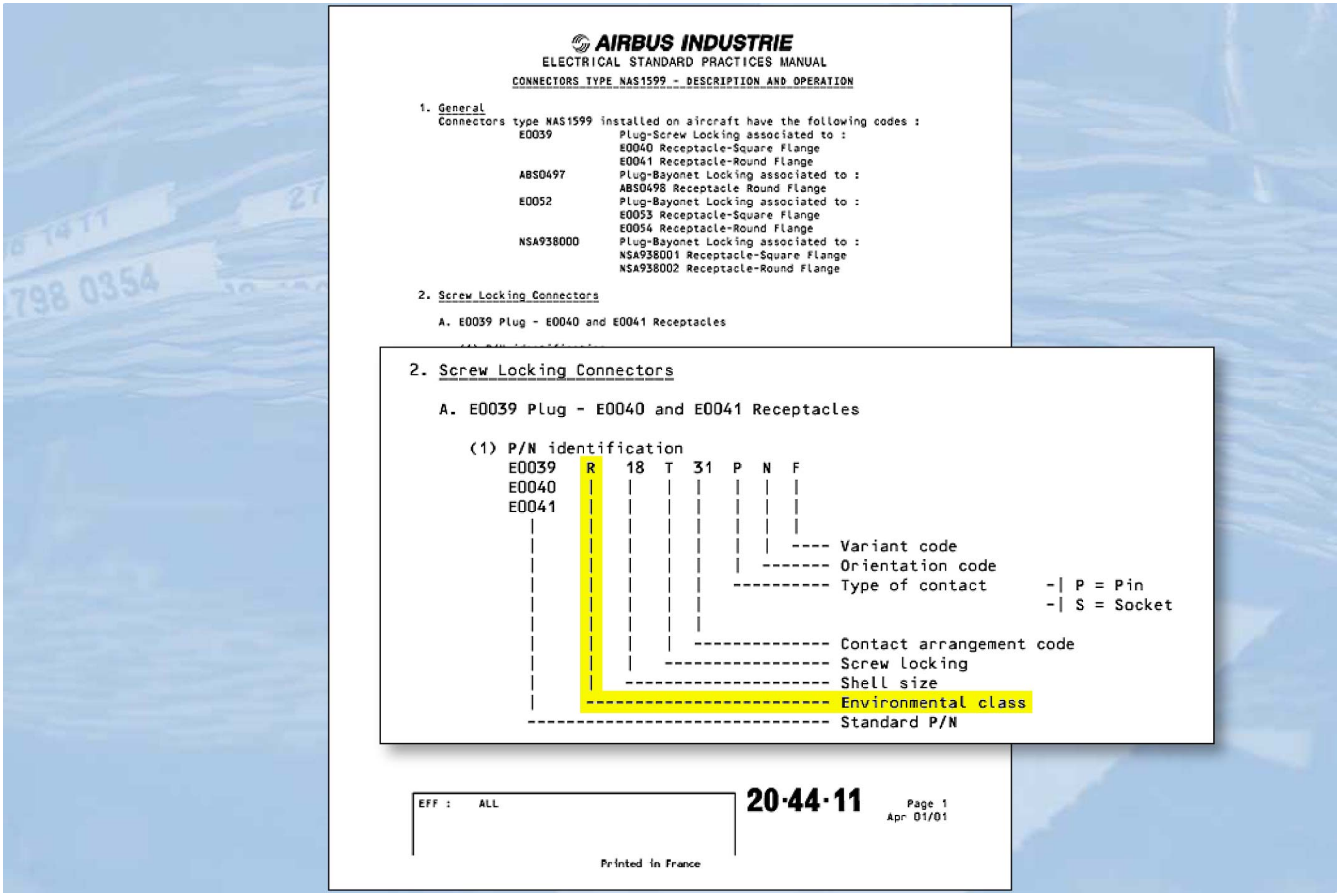
CIRCULAR CONNECTORS

X8U08481 - X0332T0 - XM2032000000001



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E0052	Plug-Bayonet Locking associated to : E0053 Receptacle-Square Flange E0054 Receptacle-Round Flange
NSA938000	Plug-Bayonet Locking associated to : NSA938001 Receptacle-Square Flange NSA938002 Receptacle-Round Flange

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(1) P/N identification

```
E0039  R  18  T  31  P  N  F
E0040  |  |   |  |   |  |  |
E0041  |  |   |  |   |  |  |
  |    |  |   |  |   |  |  |
  |    |  |   |  |   |  |  ---- Variant code
  |    |  |   |  |   |  ------- Orientation code
  |    |  |   |  |   ---------- Type of contact      -| P = Pin
  |    |  |   |  |                                   -| S = Socket
  |    |  |   |  |
  |    |  |   |  --------------- Contact arrangement code
  |    |  |   ------------------ Screw locking
  |    |  ---------------------- Shell size
  |    ------------------------- Environmental class
  ------------------------------ Standard P/N
```

EFF : ALL

20-44-11 Page 1
Apr 01/01

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CIRCULAR CONNECTORS

AIRBUS INDUSTRIE

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ABS0497	Plug-Bayonet Locking associated to : ABS0498 Receptacle Round Flange
E0052	Plug-Bayonet Locking associated to : E0053 Receptacle-Square Flange E0054 Receptacle-Round Flange
NSA938000	Plug-Bayonet Locking associated to : NSA938001 Receptacle-Square Flange NSA938002 Receptacle-Round Flange

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(1) P/N identification

```
E0039   R   18   T   31   P   N   F
E0040   |   |    |   |    |   |   |
E0041   |   |    |   |    |   |   |
  |     |   |    |   |    |   |   |
  |     |   |    |   |    |   |   ---- Variant code
  |     |   |    |   |    |   ------- Orientation code
  |     |   |    |   |    ---------- Type of contact      -| P = Pin
  |     |   |    |   |                                    -| S = Socket
  |     |   |    |   -------------- Contact arrangement code
  |     |   |    ------------------ Screw locking
  |     |   ----------------------- Shell size
  |     --------------------------- Environmental class
  --------------------------------- Standard P/N
```

EFF : ALL

20-44-11

Page 1
Apr 01/01

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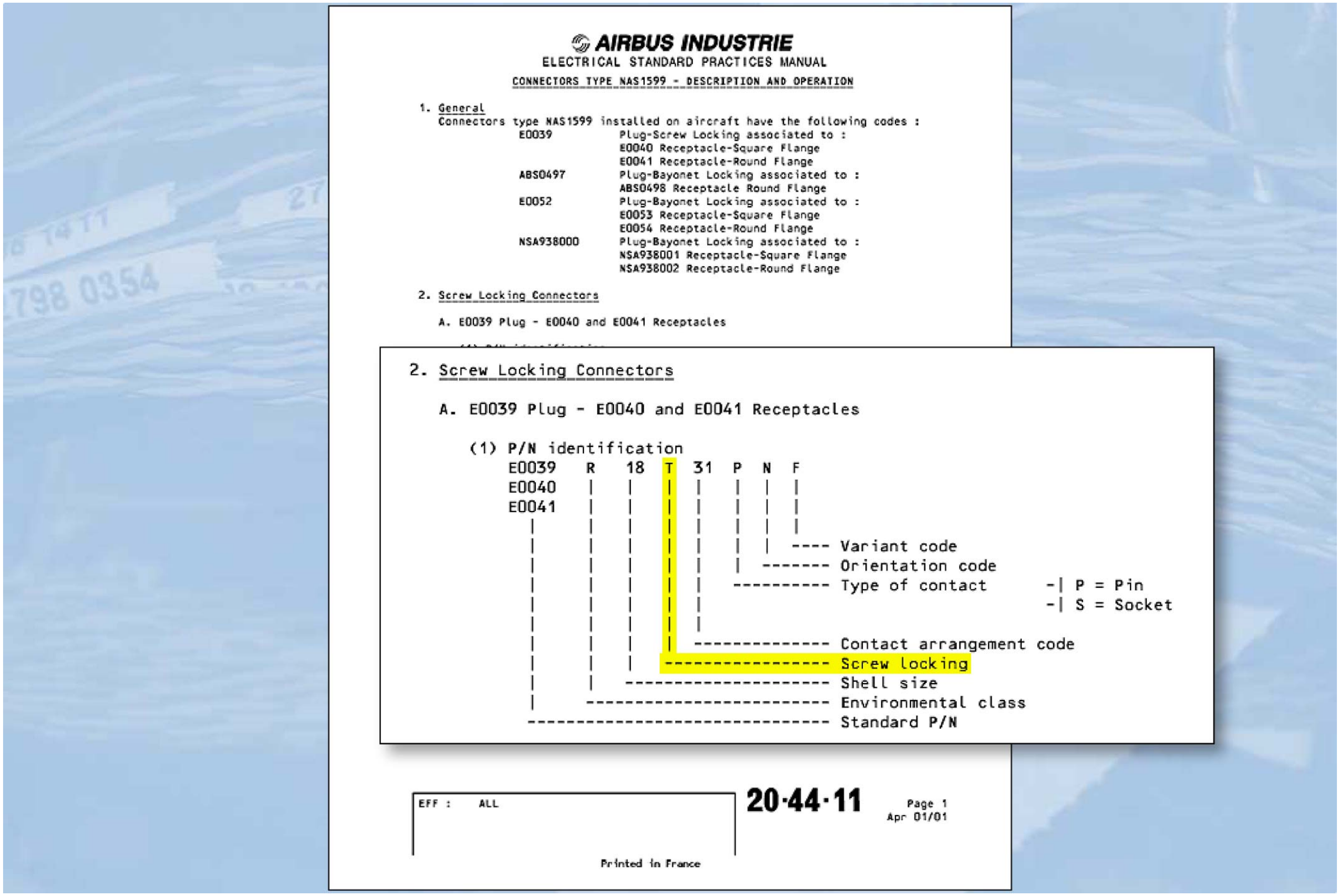
CIRCULAR CONNECTORS

X8U08481 - X0332T0 - XM2032000000001



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
CONNECTORS TYPE NAS1599 - DESCRIPTION AND OPERATION

1. General
Connectors type NAS1599 installed on aircraft have the following codes :

E0039	Plug-Screw Locking associated to : E0040 Receptacle-Square Flange E0041 Receptacle-Round Flange
ABS0497	Plug-Bayonet Locking associated to : ABS0498 Receptacle Round Flange
E0052	Plug-Bayonet Locking associated to : E0053 Receptacle-Square Flange E0054 Receptacle-Round Flange
NSA938000	Plug-Bayonet Locking associated to : NSA938001 Receptacle-Square Flange NSA938002 Receptacle-Round Flange

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(1) P/N identification

```
E0039   R   18   T   31   P   N   F
E0040   |   |    |   |    |   |   |
E0041   |   |    |   |    |   |   |
  |     |   |    |   |    |   |   |
  |     |   |    |   |    |   |   ---- Variant code
  |     |   |    |   |    |   ------- Orientation code
  |     |   |    |   |    ---------- Type of contact     -| P = Pin
  |     |   |    |   |                                   -| S = Socket
  |     |   |    |   |
  |     |   |    |   -------------- Contact arrangement code
  |     |   |    ----------------- Screw locking
  |     |   -------------------- Shell size
  |     ------------------------ Environmental class
  ------------------------------ Standard P/N
```

EFF : ALL

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Apr 01/01

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CIRCULAR CONNECTORS

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

CONNECTORS TYPE NAS1599 - DESCRIPTION AND OPERATION

1. General

Connectors type NAS1599 installed on aircraft have the following codes :

E0039	Plug-Screw Locking associated to : E0040 Receptacle-Square Flange E0041 Receptacle-Round Flange
ABS0497	Plug-Bayonet Locking associated to : ABS0498 Receptacle Round Flange
E0052	Plug-Bayonet Locking associated to : E0053 Receptacle-Square Flange E0054 Receptacle-Round Flange
NSA938000	Plug-Bayonet Locking associated to : NSA938001 Receptacle-Square Flange NSA938002 Receptacle-Round Flange

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(1) P/N identification

```
E0039   R   18  T  31  P  N  F
E0040   |   |   |  |   |  |  |
E0041   |   |   |  |   |  |  |
  |     |   |   |  |   |  |  |
  |     |   |   |  |   |  |  ---- Variant code
  |     |   |   |  |   |  ------- Orientation code
  |     |   |   |  |   ---------- Type of contact      -| P = Pin
  |     |   |   |  |                                   -| S = Socket
  |     |   |   |  |
  |     |   |   |  -------------- Contact arrangement code
  |     |   |   ----------------- Screw locking
  |     |   --------------------- Shell size
  |     ------------------------- Environmental class
  ------------------------------- Standard P/N
```

EFF : ALL

20-44-11 Page 1 Apr 01/01

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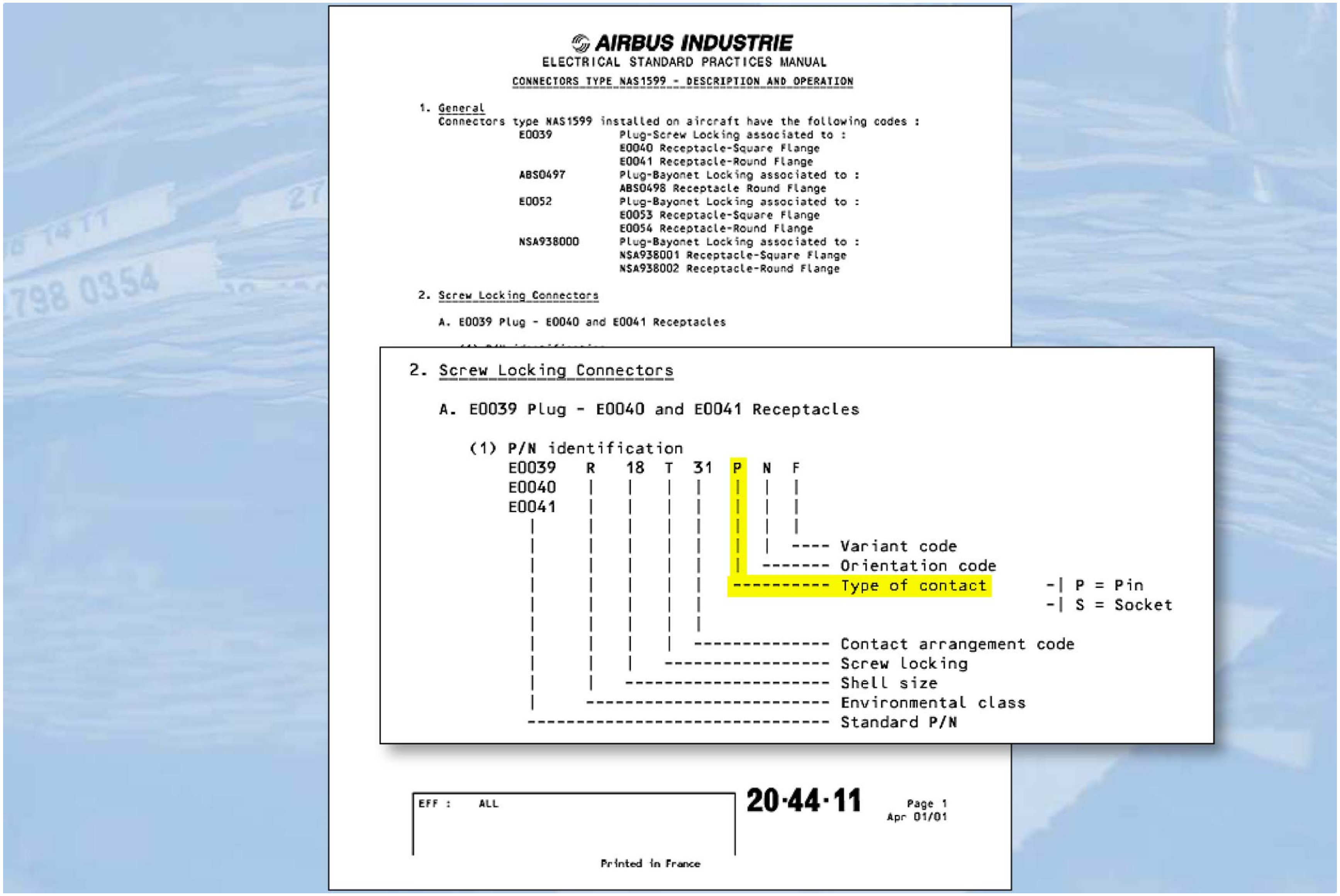
CIRCULAR CONNECTORS

X8U08481 - X0332T0 - XM2032000000001



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
CONNECTORS TYPE NAS1599 - DESCRIPTION AND OPERATION

1. General
Connectors type NAS1599 installed on aircraft have the following codes :

E0039	Plug-Screw Locking associated to : E0040 Receptacle-Square Flange E0041 Receptacle-Round Flange
ABS0497	Plug-Bayonet Locking associated to : ABS0498 Receptacle Round Flange
E0052	Plug-Bayonet Locking associated to : E0053 Receptacle-Square Flange E0054 Receptacle-Round Flange
NSA938000	Plug-Bayonet Locking associated to : NSA938001 Receptacle-Square Flange NSA938002 Receptacle-Round Flange

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(1) P/N identification

```
E0039   R   18  T  31  P  N  F
E0040   |   |   |  |   |  |  |
E0041   |   |   |  |   |  |  |
  |     |   |   |  |   |  |  |
  |     |   |   |  |   |  |  ---- Variant code
  |     |   |   |  |   |  ------- Orientation code
  |     |   |   |  |   ---------- Type of contact      -| P = Pin
  |     |   |   |  |                                   -| S = Socket
  |     |   |   |  -------------- Contact arrangement code
  |     |   |   ----------------- Screw locking
  |     |   --------------------- Shell size
  |     ------------------------- Environmental class
  ------------------------------- Standard P/N
```

EFF : ALL

20-44-11 Page 1 Apr 01/01

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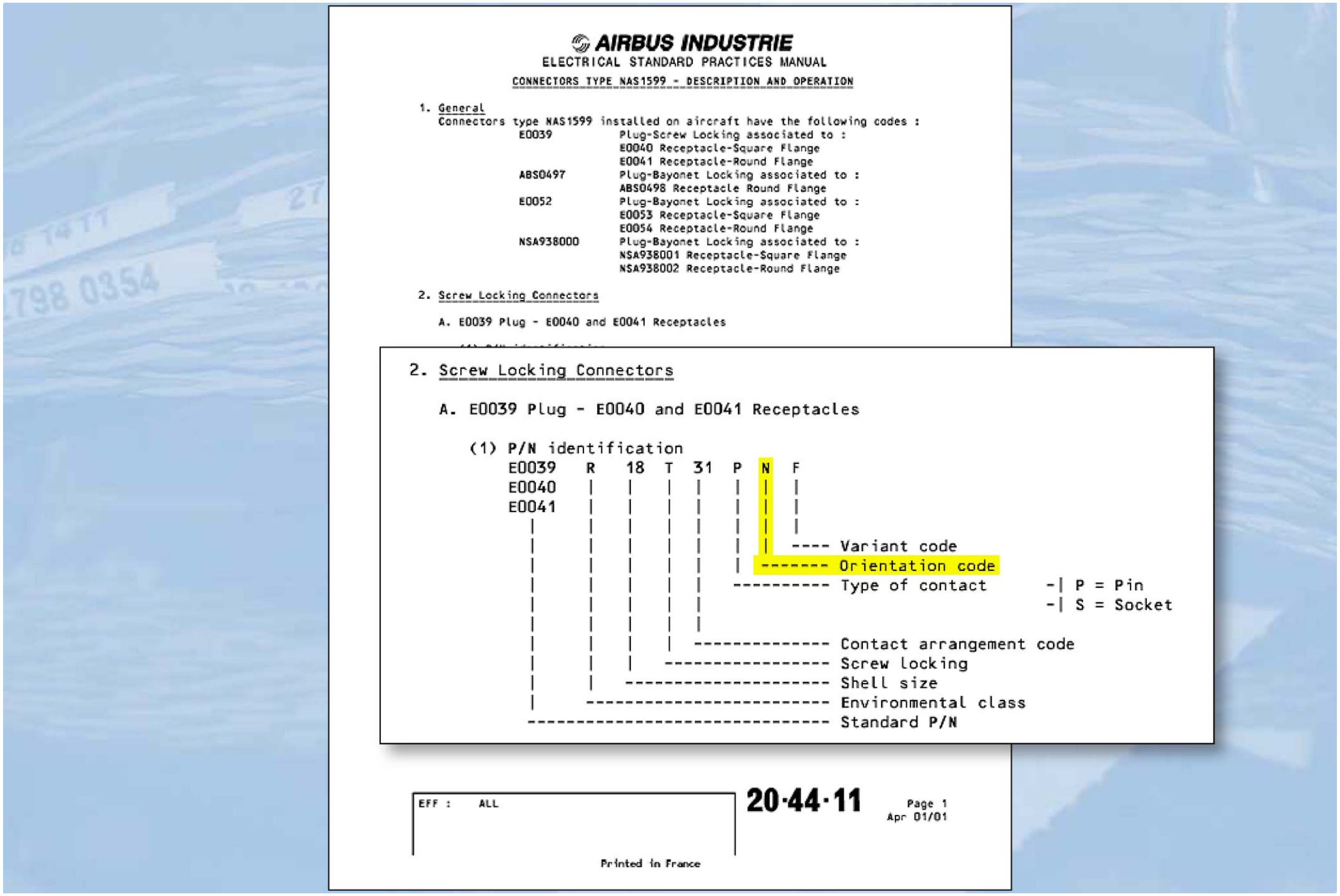
CIRCULAR CONNECTORS



AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

CONNECTORS TYPE NAS1599 - DESCRIPTION AND OPERATION

1. General

Connectors type NAS1599 installed on aircraft have the following codes :

E0039	Plug-Screw Locking associated to : E0040 Receptacle-Square Flange E0041 Receptacle-Round Flange
ABS0497	Plug-Bayonet Locking associated to : ABS0498 Receptacle Round Flange
E0052	Plug-Bayonet Locking associated to : E0053 Receptacle-Square Flange E0054 Receptacle-Round Flange
NSA938000	Plug-Bayonet Locking associated to : NSA938001 Receptacle-Square Flange NSA938002 Receptacle-Round Flange

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(1) P/N identification

```
E0039    R   18  T  31  P  N  F
E0040    |   |   |  |   |  |  |
E0041    |   |   |  |   |  |  |
  |      |   |   |  |   |  |  |
  |      |   |   |  |   |  |  ---- Variant code
  |      |   |   |  |   |  ------- Orientation code
  |      |   |   |  |   ---------- Type of contact      -| P = Pin
  |      |   |   |  |                                   -| S = Socket
  |      |   |   |  |
  |      |   |   |  -------------- Contact arrangement code
  |      |   |   ----------------- Screw locking
  |      |   --------------------- Shell size
  |      ------------------------- Environmental class
  -------------------------------- Standard P/N
```

EFF : ALL

20-44-11 Page 1 Apr 01/01

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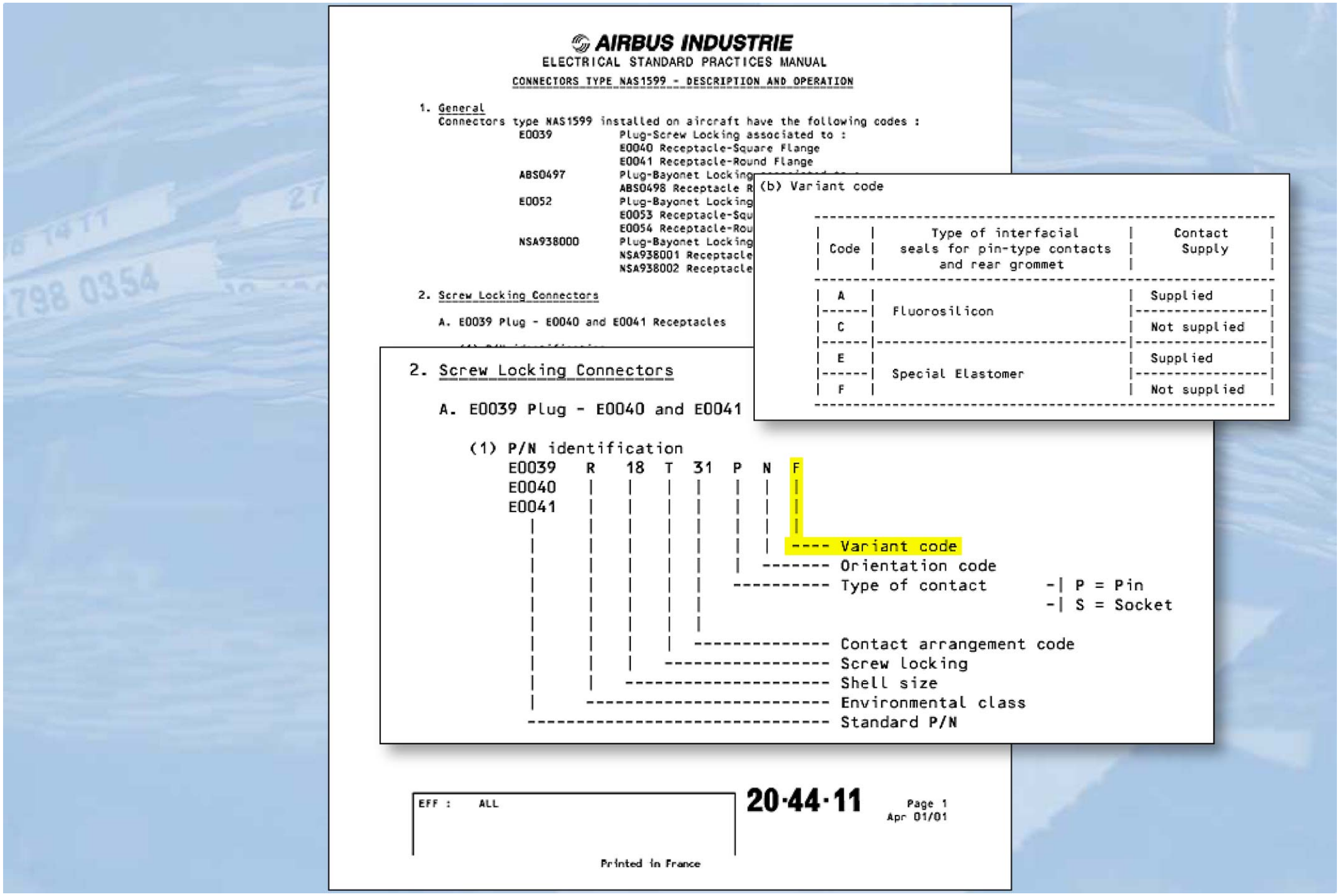
CIRCULAR CONNECTORS



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
CONNECTORS TYPE NAS1599 - DESCRIPTION AND OPERATION

1. General
Connectors type NAS1599 installed on aircraft have the following codes :

E0039	Plug-Screw Locking associated to :
	E0040 Receptacle-Square Flange
	E0041 Receptacle-Round Flange
ABS0497	Plug-Bayonet Locking
	ABS0498 Receptacle R
E0052	Plug-Bayonet Locking
	E0053 Receptacle-Squ
	E0054 Receptacle-Rou
NSA938000	Plug-Bayonet Locking
	NSA938001 Receptacle
	NSA938002 Receptacle

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(b) Variant code

Code	Type of interfacial seals for pin-type contacts and rear grommet	Contact Supply
A	Fluorosilicon	Supplied
C		Not supplied
E	Special Elastomer	Supplied
F		Not supplied

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041

(1) P/N identification

```
E0039   R   18   T   31   P   N   F
E0040   |   |    |   |    |   |   |
E0041   |   |    |   |    |   |   |
  |     |   |    |   |    |   |   ---- Variant code
  |     |   |    |   |    |   ------- Orientation code
  |     |   |    |   |    ---------- Type of contact     -| P = Pin
  |     |   |    |   |                                   -| S = Socket
  |     |   |    |   -------------- Contact arrangement code
  |     |   |    ----------------- Screw locking
  |     |   -------------------- Shell size
  |     ------------------------ Environmental class
  ------------------------------ Standard P/N
```

EFF : ALL

20-44-11 Page 1 Apr 01/01

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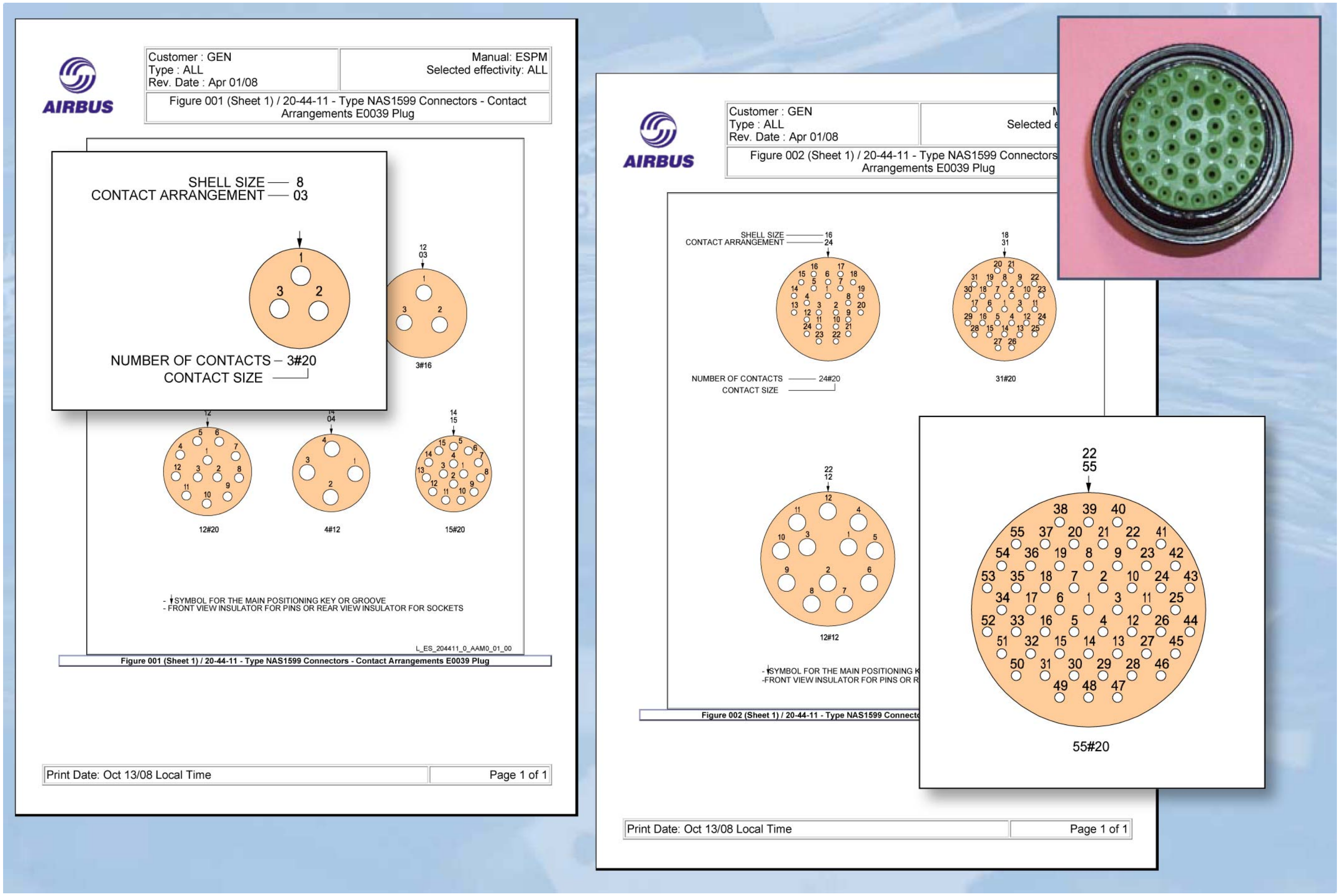
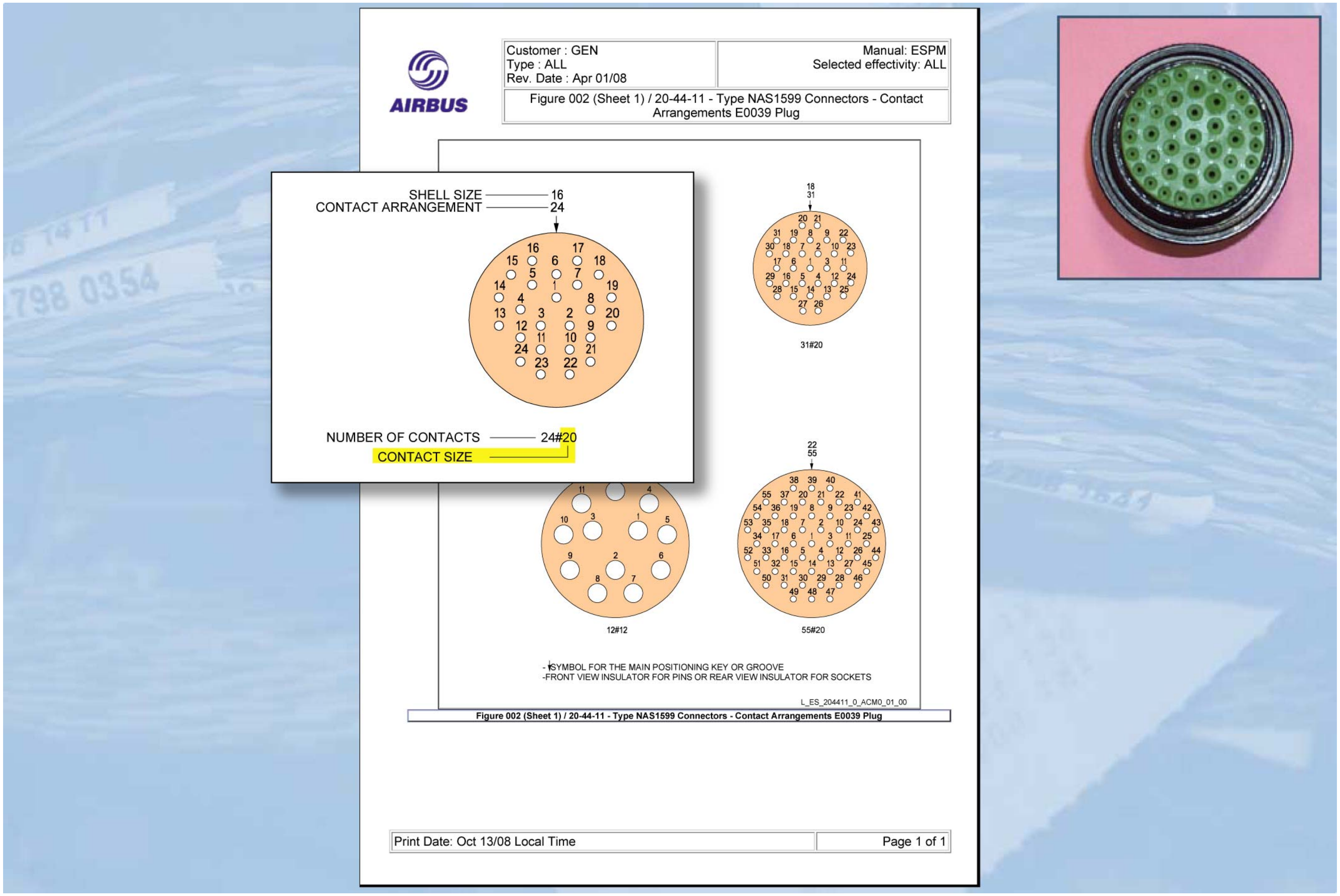
CIRCULAR CONNECTORS

X8U08481 - X0332T0 - XM203200000001



CIRCULAR CONNECTORS

X8U08481 - X0332T0 - XM2032000000001



CIRCULAR CONNECTORS

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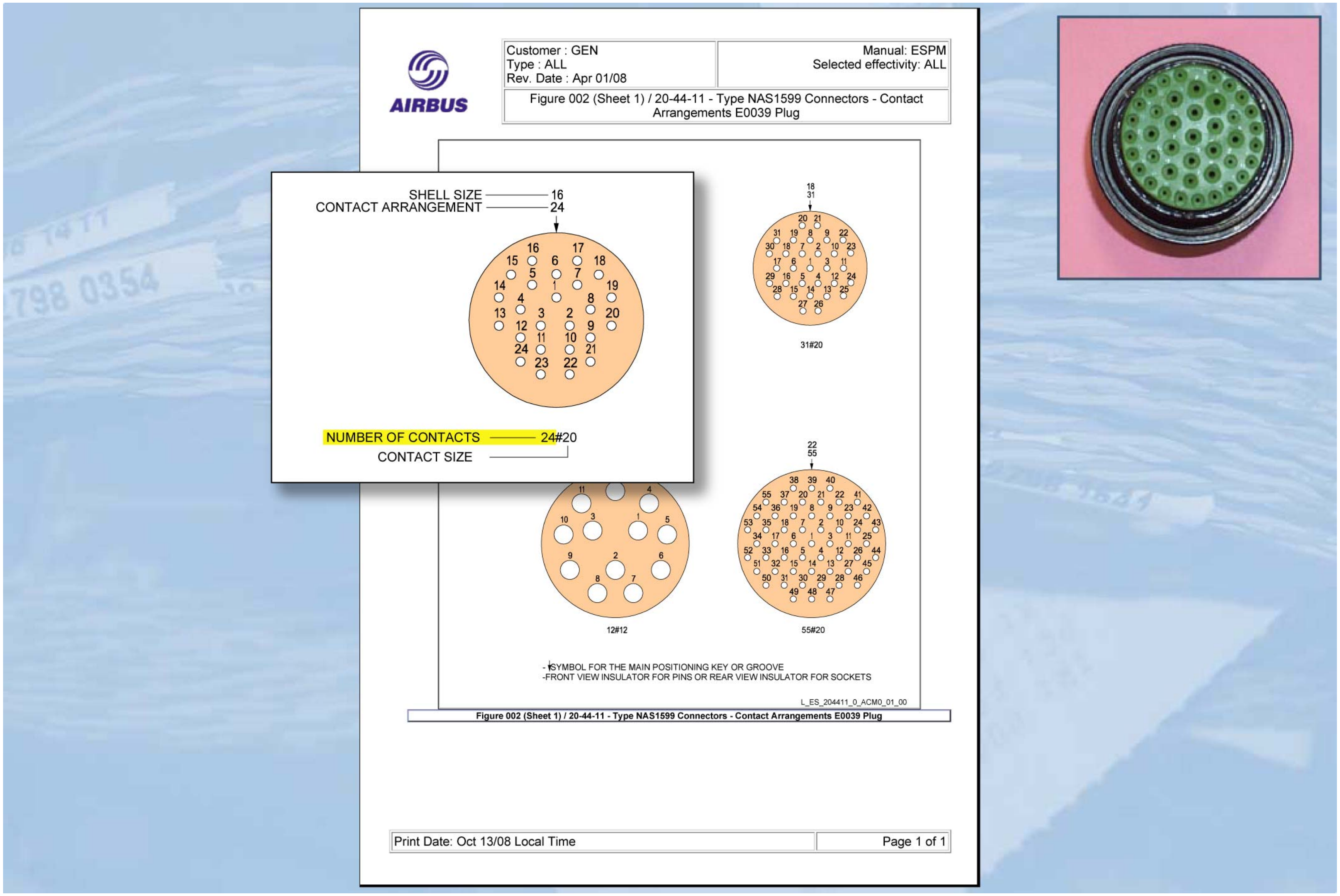
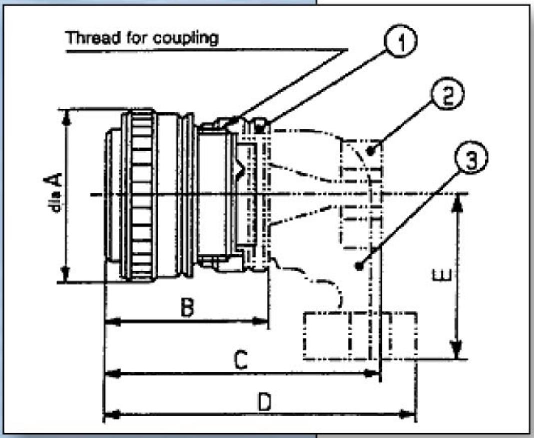


CIRCULAR CONNECTORS

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE
STANDARDS MANUAL



AIRBUS INDUSTRIE

STANDARDS MANUAL

ASN-E0039
Issue : F
Page : 2

3 DEFINITIONS - TERMINOLOGY - SYMBOLS - ABBREVIATIONS

Not applicable.

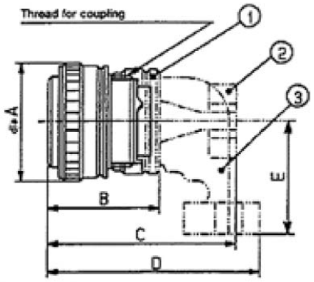
4 REQUIRED CHARACTERISTICS

4.1 Dimensions and weights

The dimensions given below are the maximum values stipulated in NAS 1643 and can thus be reduced considerably.

Weights are approximate and listed for information only.

Overall dimensions are listed below for all three types:



① - Plug with backnut backshell,

② - Plug with straight cable clamp backshell,

③ - Plug with elbow cable clamp backshell.

TABLE 1

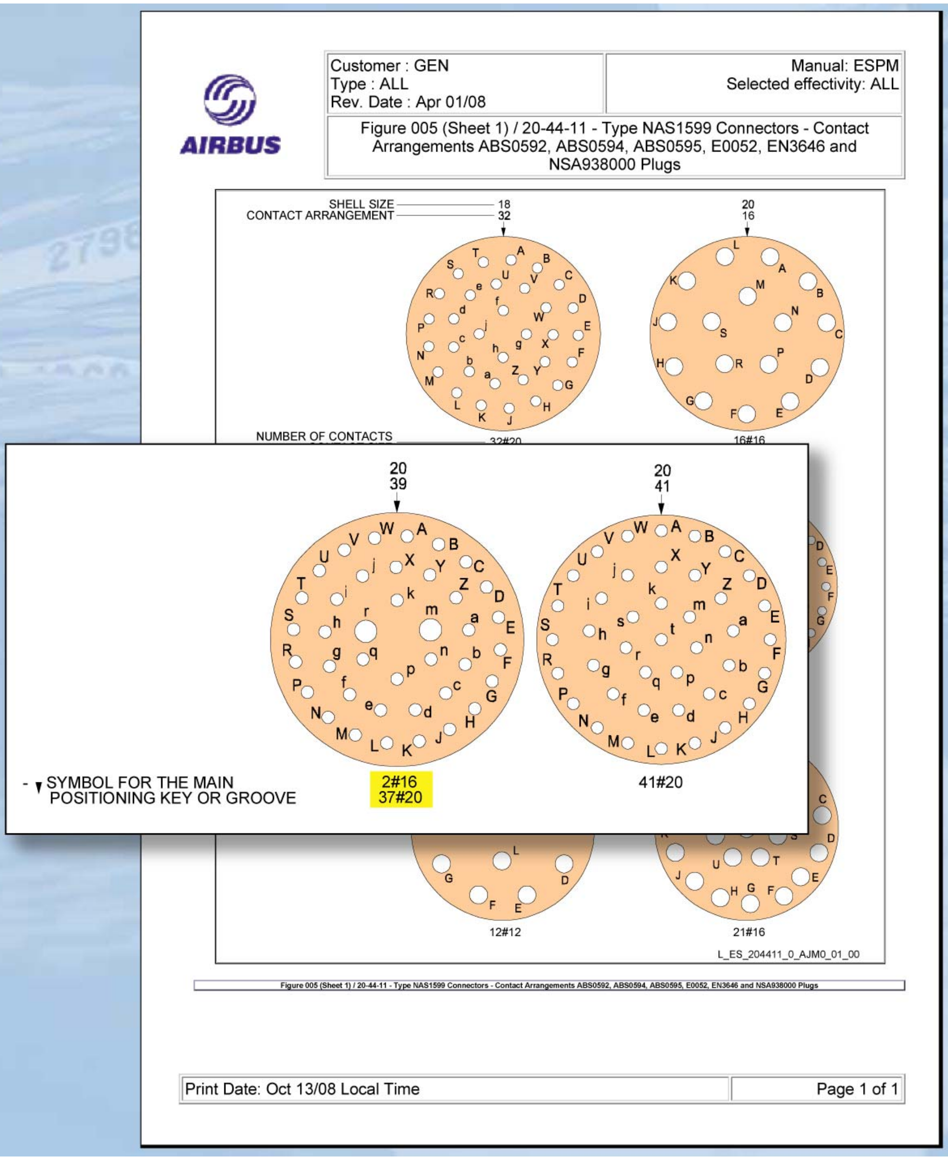
Dimensions in millimetres

CASING NO.	A max.	B max. ①	C max. ②	D max. ③	E max. ③	THREAD FOR COUPLING (UNEF-2A)	WEIGHT (g)	
							with pin contact	with socket contact
08	19,2	34,5				.5000-20		
10	23,0	37,0	45,9	52,9	22,4	.6250-24	16,0	17,0
12	27,4			56,3	24,2	.7500-20	18,0	19,0
14	29,0			58,6	25,7	.8750-20	25,0	27,0
16	32,2			62,0	27,2	1.0000-20		
18	34,9		51,9	64,5	28,7	1.0625-18	37,0	41,0
22	41,3			71,0	32,0	1.3125-18	61,0	67,0

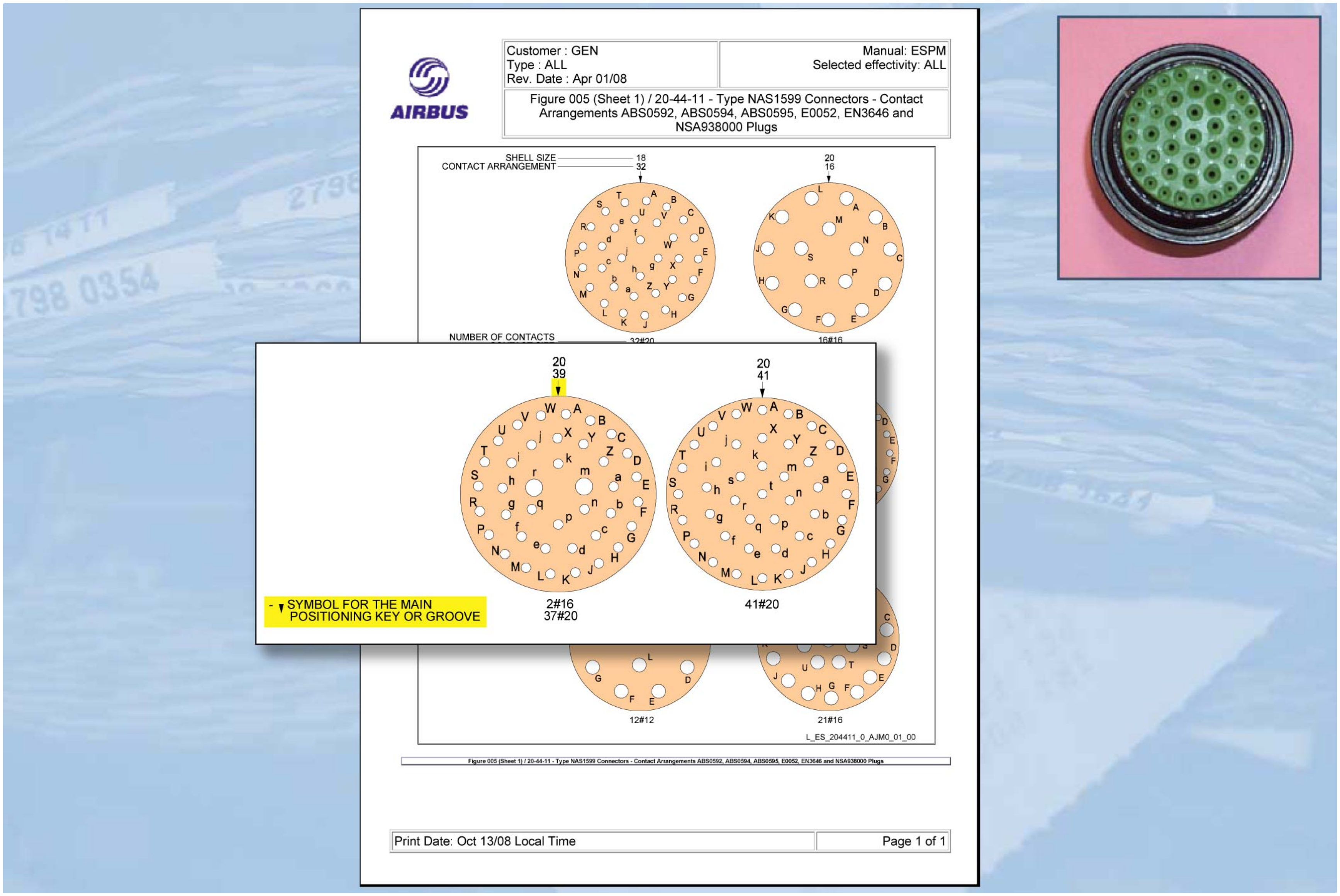
E 938104 /1

CIRCULAR CONNECTORS

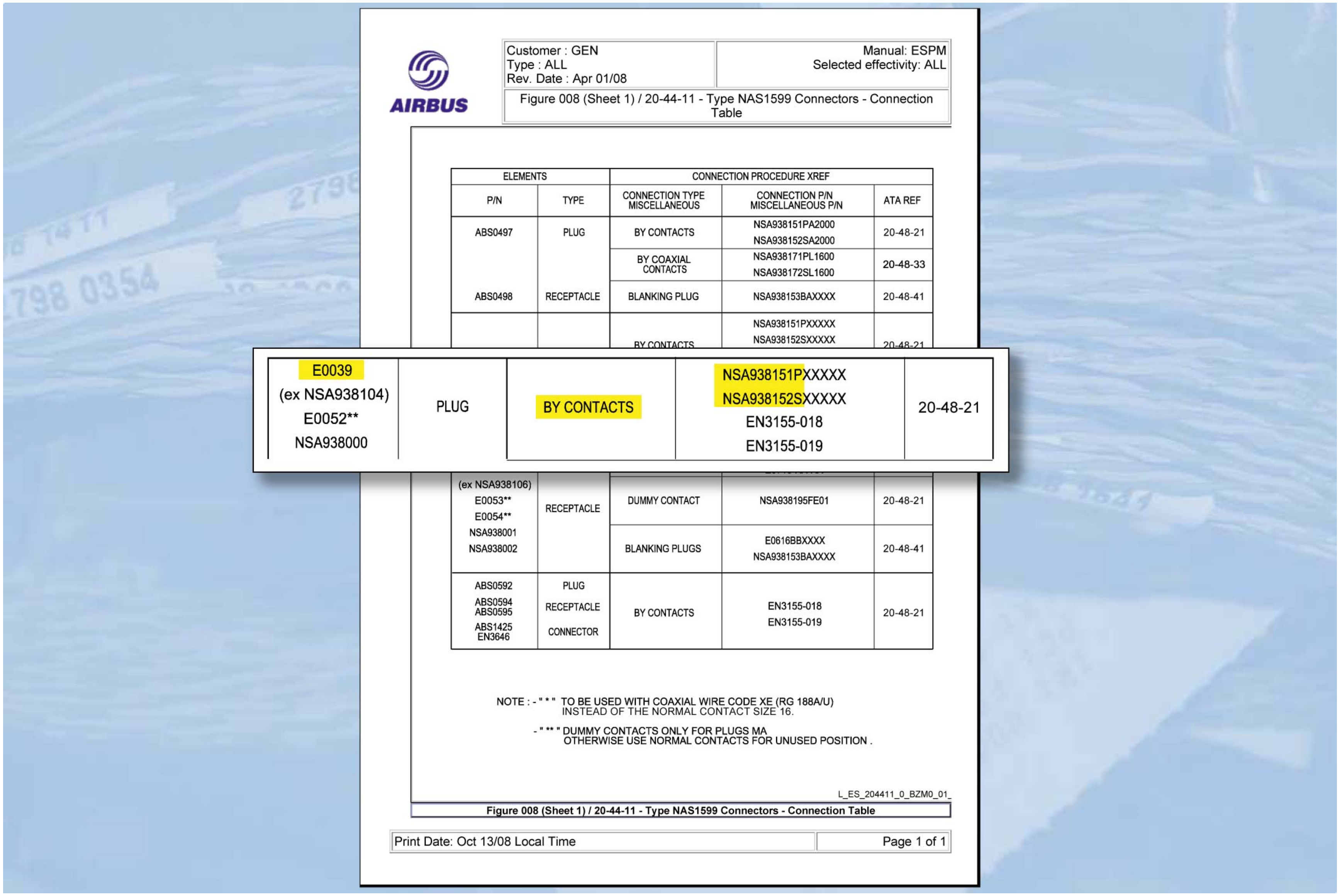
X8U08481 - X0332T0 - XM2032000000001



CIRCULAR CONNECTORS



CIRCULAR CONNECTORS



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 008 (Sheet 1) / 20-44-11 - Type NAS1599 Connectors - Connection Table

ELEMENTS		CONNECTION PROCEDURE XREF		
P/N	TYPE	CONNECTION TYPE MISCELLANEOUS	CONNECTION P/N MISCELLANEOUS P/N	ATA REF
ABS0497	PLUG	BY CONTACTS	NSA938151PA2000 NSA938152SA2000	20-48-21
		BY COAXIAL CONTACTS	NSA938171PL1600 NSA938172SL1600	20-48-33
ABS0498	RECEPTACLE	BLANKING PLUG	NSA938153BAXXXX	20-48-41
E0039 (ex NSA938104) E0052** NSA938000	PLUG	BY CONTACTS	NSA938151PXXXXX NSA938152SXXXXX EN3155-018 EN3155-019	20-48-21
(ex NSA938106) E0053** E0054** NSA938001 NSA938002	RECEPTACLE	DUMMY CONTACT	NSA938195FE01	20-48-21
		BLANKING PLUGS	E0616BBXXXX NSA938153BAXXXX	20-48-41
ABS0592 ABS0594 ABS0595 ABS1425 EN3646	PLUG RECEPTACLE CONNECTOR	BY CONTACTS	EN3155-018 EN3155-019	20-48-21

NOTE : - " * " TO BE USED WITH COAXIAL WIRE CODE XE (RG 188A/U) INSTEAD OF THE NORMAL CONTACT SIZE 16.
- " ** " DUMMY CONTACTS ONLY FOR PLUGS MA OTHERWISE USE NORMAL CONTACTS FOR UNUSED POSITION .

L_ES_204411_0_BZM0_01_

Figure 008 (Sheet 1) / 20-44-11 - Type NAS1599 Connectors - Connection Table

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CIRCULAR CONNECTORS

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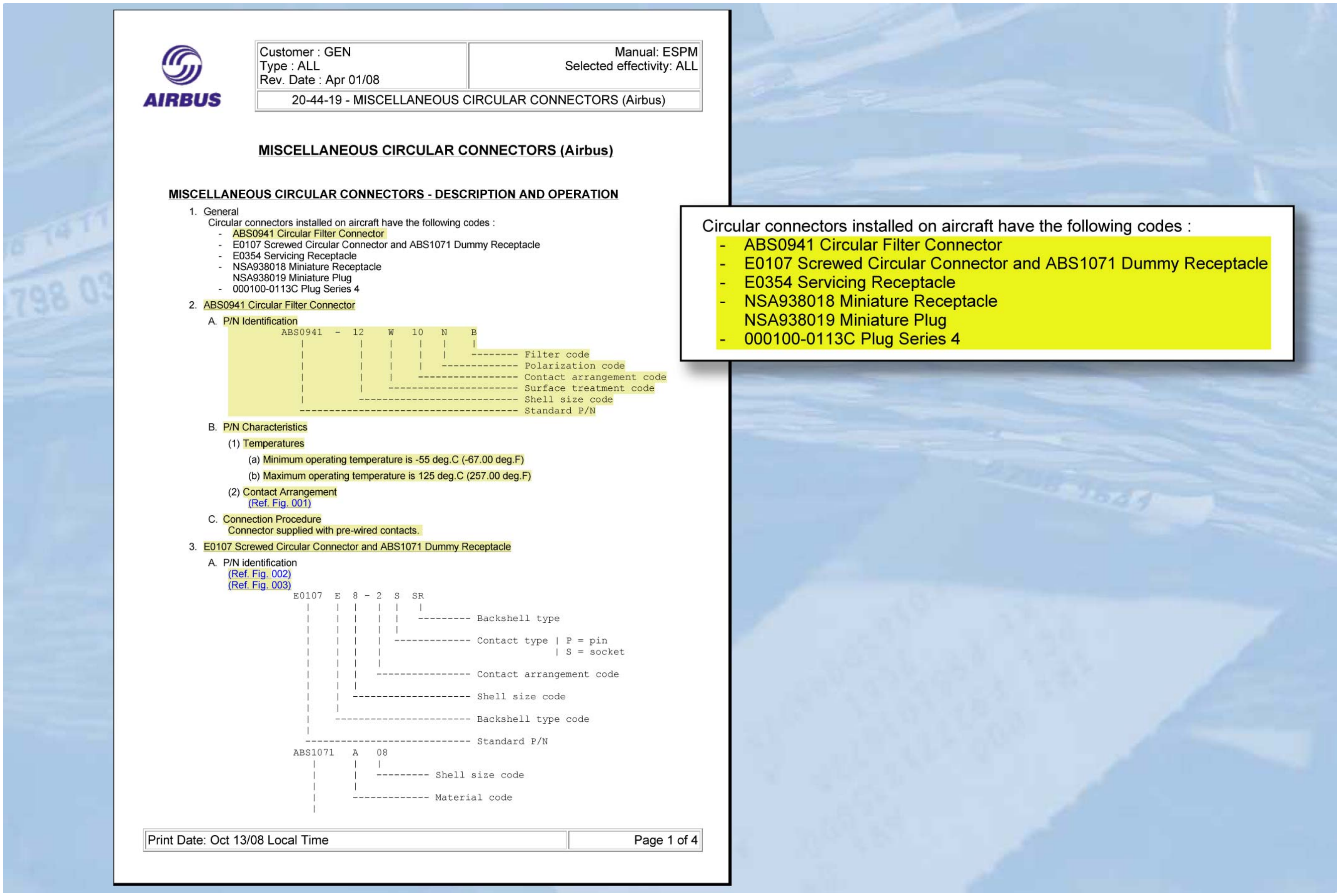
GENERAL TYPES AND IDENTIFICATION

MISCELLANEOUS CIRCULAR CONNECTORS

Example of miscellaneous circular connector.
Some miscellaneous circular connectors are not identified under a spec number but under a manufacturer number.
PN characteristics of this connector are given.
Same thing for the contact arrangements.
Finally, to know the contact to be used, you must refer to the connection table.



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-44-19 - MISCELLANEOUS CIRCULAR CONNECTORS (Airbus)	

MISCELLANEOUS CIRCULAR CONNECTORS (Airbus)

MISCELLANEOUS CIRCULAR CONNECTORS - DESCRIPTION AND OPERATION

1. General
   Circular connectors installed on aircraft have the following codes :
   - ABS0941 Circular Filter Connector
   - E0107 Screwed Circular Connector and ABS1071 Dummy Receptacle
   - E0354 Servicing Receptacle
   - NSA938018 Miniature Receptacle
     NSA938019 Miniature Plug
   - 000100-0113C Plug Series 4
2. ABS0941 Circular Filter Connector
   A. P/N Identification

```
ABS0941  -  12    W   10   N    B
   |         |    |    |   |    |
   |         |    |    |   |    -------- Filter code
   |         |    |    |   ------------- Polarization code
   |         |    |    ----------------- Contact arrangement code
   |         |    ---------------------- Surface treatment code
   |         --------------------------- Shell size code
   ------------------------------------- Standard P/N
```

   B. P/N Characteristics
      (1) Temperatures
         (a) Minimum operating temperature is -55 deg.C (-67.00 deg.F)
         (b) Maximum operating temperature is 125 deg.C (257.00 deg.F)
      (2) Contact Arrangement
         (Ref. Fig. 001)
   C. Connection Procedure
      Connector supplied with pre-wired contacts.
3. E0107 Screwed Circular Connector and ABS1071 Dummy Receptacle
   A. P/N identification
      (Ref. Fig. 002)
      (Ref. Fig. 003)

```
E0107  E  8 - 2  S  SR
  |    |  |   |  |   |
  |    |  |   |  |   --------- Backshell type
  |    |  |   |  |
  |    |  |   |  ------------- Contact type | P = pin
  |    |  |   |                             | S = socket
  |    |  |   |
  |    |  |   ---------------- Contact arrangement code
  |    |  |
  |    |  -------------------- Shell size code
  |    |
  |    ----------------------- Backshell type code
  |
  ---------------------------- Standard P/N
ABS1071   A   08
   |      |   |
   |      |   --------- Shell size code
   |      |
   |      ------------- Material code
   |
```

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Circular connectors installed on aircraft have the following codes :
- ABS0941 Circular Filter Connector
- E0107 Screwed Circular Connector and ABS1071 Dummy Receptacle
- E0354 Servicing Receptacle
- NSA938018 Miniature Receptacle
  NSA938019 Miniature Plug
- 000100-0113C Plug Series 4

X8U08481 - X0332T0 - XM2032000000001

MISCELLANEOUS CIRCULAR CONNECTORS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-44-19 - MISCELLANEOUS CIRCULAR CONNECTORS (Airbus)	

- Shrink the sleeve.

(3) Only for E0354-302

- Use a torque screwdriver to attach the terminals to the connector. TORQUE the screws at the value :
  for diameter 3 : 0.055 m.daN (4.86 lbf.in)
  for diameter 4 : 0.10 m.daN (8.84 lbf.in)
- With a spray gun or a brush, apply a very thin coat of PM820 (ASNA4183).
- Let it dry 1 minute before the next operation.
- Apply CAF4 (ASNA4183) or NSA5036 or equivalent on the heads of the screws.

5. Miniature Connectors NSA938018 and NSA938019

A. P/N identification

```
NSA938018  A  5  27  S  1
NSA938019  A  5  27  S  1
    |      |  |  |   |  |
    |      |  |  |   |  ------- Crimp type connection
    |      |  |  |   |
    |      |  |  |   ---------- Contact type code | P: Pin
    |      |  |  |                                | S: Socket
    |      |  |  |
    |      |  |  -------------- Number of contacts
    |      |  |
    |      |  ----------------- Shell size code
    |      |
    |      -------------------- Delivery code | A: without contact
    |                                         | no code: with contacts
    |
    --------------------------- Standard P/N
```

B. P/N characteristics

B. P/N characteristics

(1) Temperature
Minimum operating temperature is -55 deg.C (-67.00 deg.F)
Maximum operating temperature is +125 deg.C (+257.00 deg.F) .

(2) Contact arrangement
(Ref. Fig. 006)

C. Connection procedure
For connection procedure (Ref. Connection Table paragraph)

(1) Remove backshell ferrule and sealing grommet from connector.

(2) To connect a new wire:
- use crimp tool P/N 000407-0001 (BUCHANAN) or P/N 000407-0111 (DAVO)
- insert contact into its appropriate hole using tool P/N 000407-0003

(3) To disconnect a wire:
- use extraction tool P/N 000407-0004 and release contact from rear of the insulator.

(4) Assemble backshell ferrule and sealing grommet on connector.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 007 (Sheet 1) / 20-44-19 - Miscellaneous Circular Connectors - Contacts and tools 000100-0113C	

VIKING
000101-0113C

CONTACT	INSERTION/EXTRACTION TOOLS			
SOCKET	UTILIZATION	NORM	P/N	COLOR
VP/4CS15	INSERTION	VIKING	000407-0003	-
	EXTRACTION		000407-0004	-

CONTACT	HAND CRIMPING TOOL			
	TOOL		COLOR	SELECTOR POSITION
	NORM	P/N		
VP/4CS15	BUCHANAN	000407-0001	-	-
	DAVO	000407-0111		

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Figure 007 (Sheet 1) / 20-44-19 - Miscellaneous Circular Connectors - Contacts and tools 000100-0113C

Print Date: Oct 13/08 Local Time	Page 1 of 1

MISCELLANEOUS CIRCULAR CONNECTORS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-44-14 - Type MIL-C-5015 Connectors - Contact Arrangements SOURIAU 8915-61

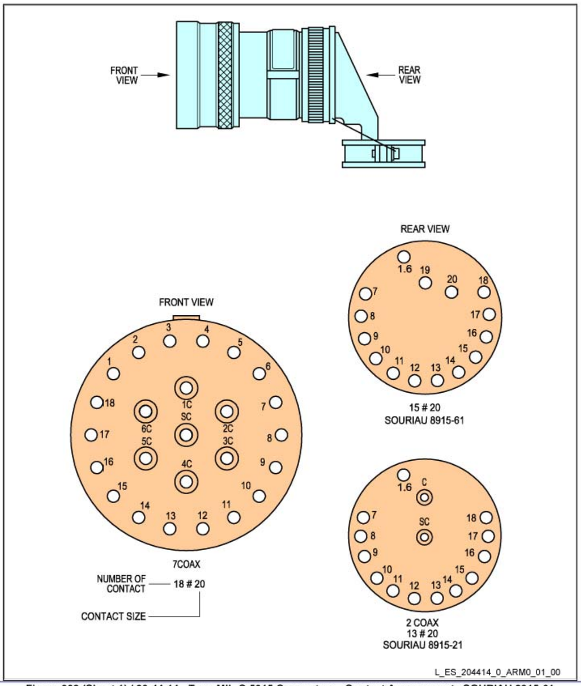

Figure 002 (Sheet 1) / 20-44-14 - Type MIL-C-5015 Connectors - Contact Arrangements SOURIAU 8915-61

Print Date: Oct 13/08 Local Time	Page 1 of 1

MISCELLANEOUS CIRCULAR CONNECTORS

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 010 (Sheet 1) / 20-44-14 - Type MIL-C-5015 and EN6047 Connectors - Connection Table

ELEMENTS		CONNECTION PROCEDURE XREF		
P/N	TYPE	CONNECTION TYPE MISCELLANEOUS	CONNECTION P/N MISCELLANEOUS P/N	ATA REF
E0094 NSA938932 E0093 NSA938931	PLUG RECEPTACLE	BY CONTACTS	NSA938184PVXXXX * NSA938185SVXXXX	20-48-23
		SLEEVES	NSA937210-2-30	20-48-23
			NSA937494-XX-XX OR E0718-XX-XX	
		BLANKING PLUG	E0616BBXXXX	20-48-41
			NSA938153BBXXXX	
E0095 E0233 NSA938922B E0111 NSA938922A	CONNECTOR PLUG RECEPTACLE	BY CONTACTS	E0347FR0801 E0347DR0801	20-48-23
		REDUCER	NSA938186-XX	
		BLANKING PLUG	E0616BB2000	20-48-41
			NSA938153BAXXXX	
E0378 E0098 EN6047K NSA938930	PLUG RECEPTACLE	BY CONTACTS	NSA938182PTXXXX NSA938183STXXXX	20-48-23
			CANNON 030-2111-000 CANNON 031-1194-000	
E0378 E0098 EN6047K NSA938930	CONNECTOR	BY CONTACTS	EN3155-053 EN3155-052 SOURIAU 8950-5883 SOURIAU 8950-6022	20-48-24
NSA938925	CONNECTOR	BY CONTACTS	NSA938192FCXXXX NSA938192DCXXXX	20-48-23
		SLEEVES	NSA937494-01-XX OR E0718-01-XX	20-48-23
			NSA937210MBXXXX	
		BLANKING PLUG	NSA938153BAXXXX	20-48-41
SOURIAU 8915-21 8915-61	PLUG A	BY CONTACT	NSA938152SA2000	20-48-21
		BY COAXIAL CONTACT	NSA938171PL1600	20-48-33

* SHORT SOCKETS ARE USED WITH CONNECTOR SHELL SIZE CODES FROM 10SL TO 16S.
LONG SOCKETS ARE USED WITH PLUG SHELL SIZE CODES FROM 16 TO 28.
AND WITH RECEPTACLE SHELL SIZE CODES FROM 16 TO 36.

L_ES_204414_0_BZM0_01_00

Figure 010 (Sheet 1) / 20-44-14 - Type MIL-C-5015 and EN6047 Connectors - Connection Table

Print Date: Oct 13/08 Local Time	Page 1 of 1

MISCELLANEOUS CIRCULAR CONNECTORS

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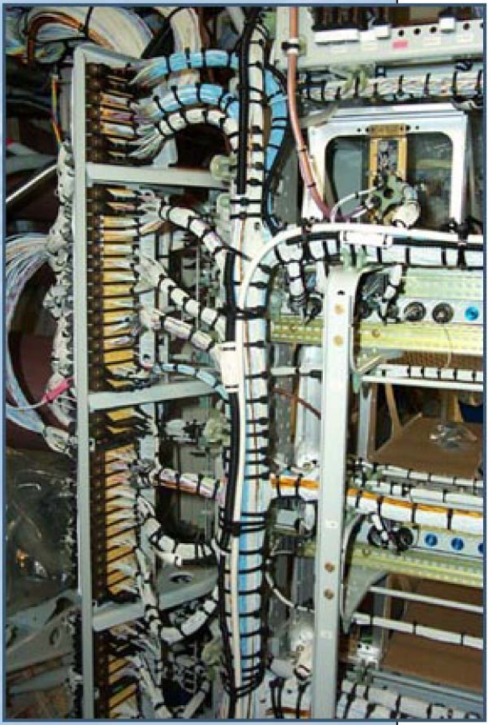
GENERAL TYPES AND IDENTIFICATION

RECTANGULAR CONNECTORS

Example of rectangular connectors
Connectors of the ARINC 600 type installed on aircraft have the following codes:
- ABS0831 connector with grounding contacts.
- E0161 plug size 1 associated with E0162 receptacle size 1.
- E0163 plug size 2 associated with E0164 receptacle size 2.
- E0165 plug size 3.
- E0179 insert for ARINC 600 connectors.

Polarization codes:
Polarization keys are used in this type of plug.
This is to avoid a calculator inversion.
Polarization tables:
This table enables an adjustment of the position of the keys depending on the connector polarization code.
The inserts (PN E0179) have different contact arrangements as shown in this page.
And the contacts to use are retrievable in the connection table given at each end of subject.
Another type of rectangular connector used on aircraft is the E0390 PN.
The contact arrangement is retrievable by using the same philosophy as for the other connectors in the illustration (See this example).
For the polarization keys installation you must:
- Engage the polarization key in its cavity in the correct orientation.
- Push until you hear a metallic click.

For the polarization key removal you must:
- Push the polarization key with the tool to retract the retaining ring.
- Manually remove the polarization key.



AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

CONNECTORS TYPE ARINC600 - DESCRIPTION AND OPERATION

1. General
   Connectors of the ARINC 600 type installed on aircraft have the following codes :
   - ABS0831 connector with grounding contacts.
   - E0161 plug size 1 associated with E0162 receptacle size 1.
   - E0163 plug size 2 associated with E0164 receptacle size 2.
   - E0165 plug size 3.
   - E0179 insert for ARINC 600 connectors.

2. ABS0831 Connector

   A. P/N Identification

   (1) For complete connector:

```
ABS0831  D  G  D1A  91    XX
   |     |  |   |    |     |
   |     |  |   |    |     ------ Variant code
   |     |  |   |    ------------ Polarization code
   |     |  |   ----------------- Contact configuration code
   |     |  --------------------- Connector type code | G = Unsealed with
   |     |                                            |     ground contacts
   |     |                                            | H = Sealed with
   |     |                                            |     ground contacts
   |     |
   |     |                                            | A = E0161
   |     ------------------------- Basic connector code | C = E0163
   |                                                  | D = E0165
   ------------------------------- Standard P/N
```

   (2) For components:

```
ABS0831  MK  D1
   |     |   |
   |     |   ---------- Version code
   |     -------------- Component type code | MK = Polarization key, male
   |                                        | RP = Retention plate
   |                                        | FK = Polarization key, female
   |                                        | BB = Fixing screws for signal
   |                                        |      retention plate
   |                                        | WW = Spring washers for fixing
   |                                        |      screws
   -------------------- Standard P/N
```

EFF : ALL

R

20-44-22

Page 1
Apr 01/02

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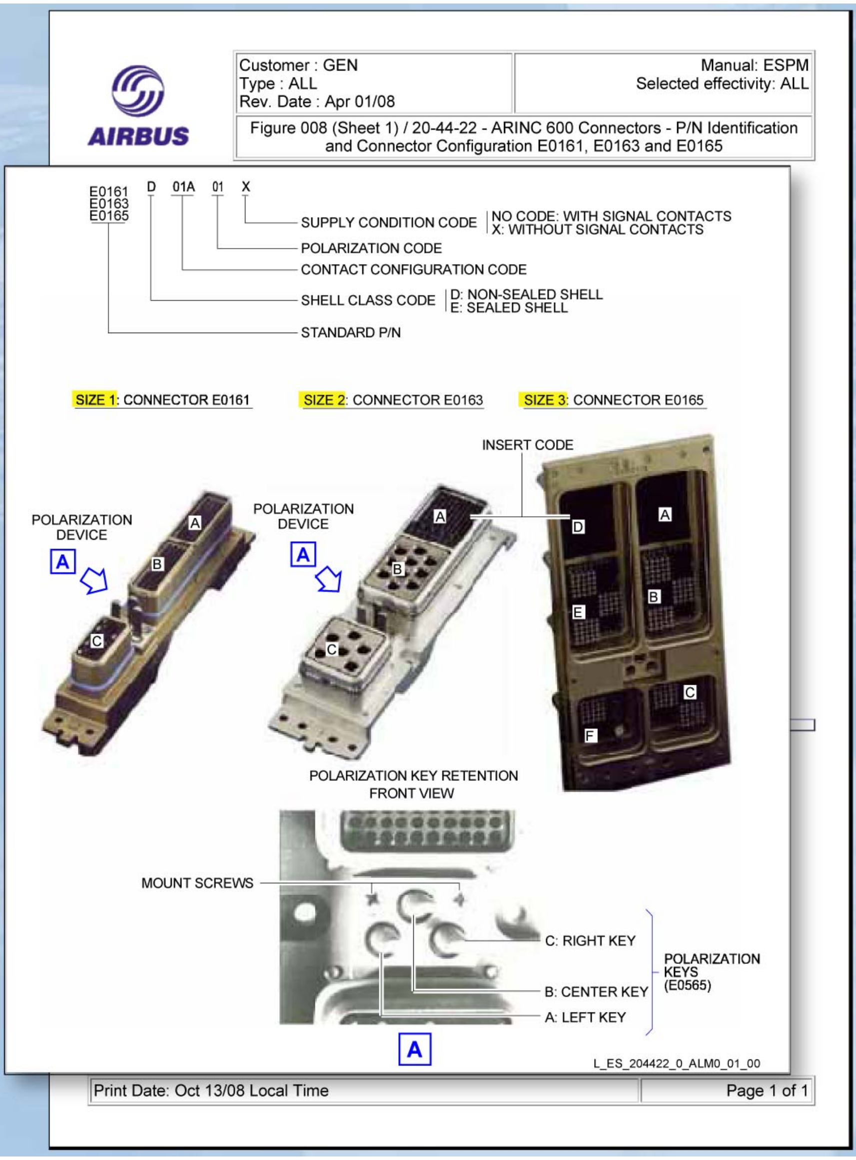
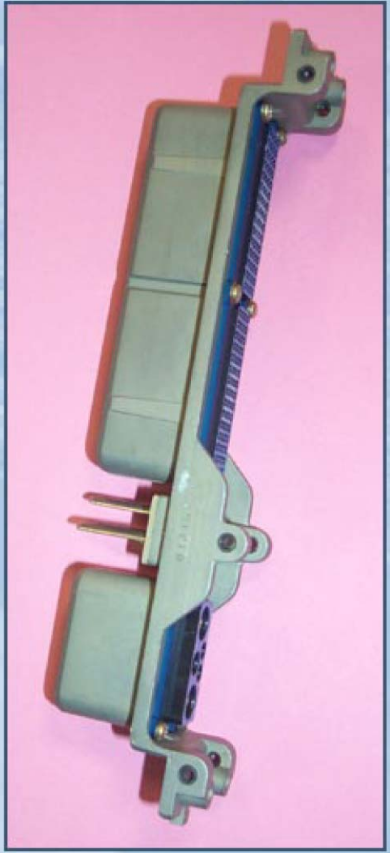
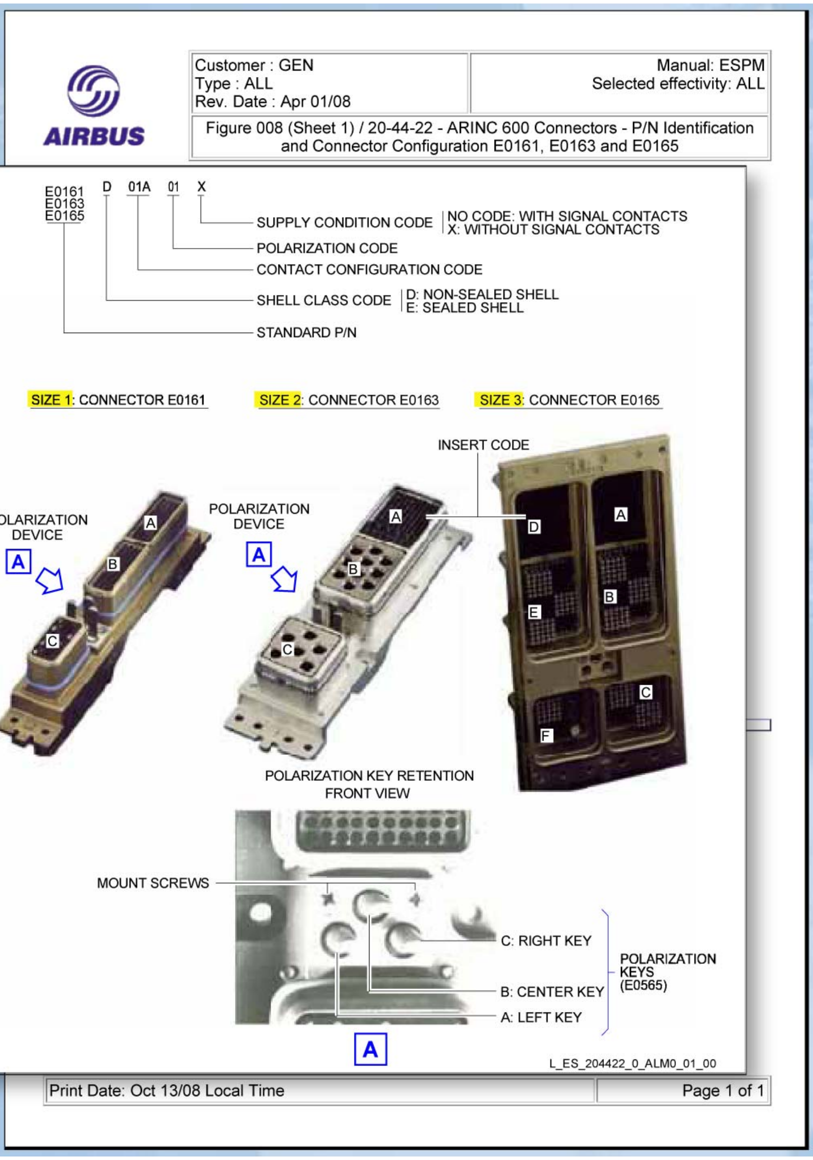
RECTANGULAR CONNECTORS



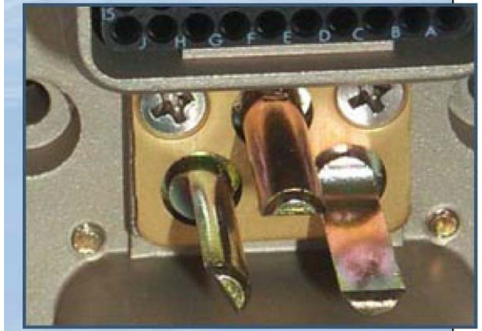


RECTANGULAR CONNECTORS



RECTANGULAR CONNECTORS

X8U08481 - X0332T0 - XM203200000001



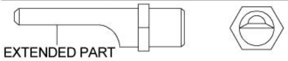
Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 009 (Sheet 1) / 20-44-22 - ARINC 600 Connectors - Polarization System
E0565 KEY for 0161, E0163 and E0165 Connectors

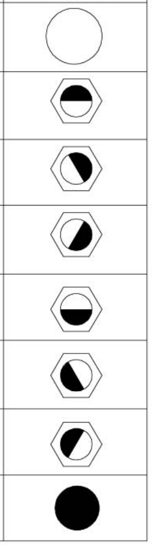
POLARIZATION CODE						PLUGS (RACK) KEYS		RECEPTACLES (EQUIPMENT) KEYS	
						A	C	A	C
01	37	73	109	145	181	1	1	4	4
02	38	74	110	146	182	2	1	4	3
03	39	75	111	147	183	3	1	4	2
04	40	76	112	148	184	4	1	4	1
05	41	77	113	149	185	5	1	4	6
06	42	78	114	150	186	6	1	4	5
07	43	79	115	151	187	1	6	5	4
08	44	80	116	152	188	2	6	5	3
09	45	81	117	153	189	3	6	5	2
10	46	82	118	154	190	4	6	5	1
11	47	83	119	155	191	5	6	5	6
12	48	84	120	156	192	6	6	5	5
13	49	85	121	157	193	1	5	6	4
14	50	86	122	158	194	2	5	6	3
15	51	87	123	159	195	3	5	6	2
16	52	88	124	160	196	4	5	6	1
17	53	89	125	161	197	5	5	6	6
18	54	90	126	162	198	6	5	6	5
19	55	91	127	163	199	1	4	1	4
20	56	92	128	164	200	2	4	1	3
21	57	93	129	165	201	3	4	1	2
22	58	94	130	166	202	4	4	1	1
23	59	95	131	167	203	5	4	1	6
24	60	96	132	168	204	6	4	1	5
25	61	97	133	169	205	1	3	2	4
26	62	98	134	170	206	2	3	2	3
27	63	99	135	171	207	3	3	2	2
28	64	100	136	172	208	4	3	2	1
29	65	101	137	173	209	5	3	2	6
30	66	102	138	174	210	6	3	2	5
31	67	103	139	175	211	1	2	3	4
32	68	104	140	176	212	2	2	3	3
33	69	105	141	177	213	3	2	3	2
34	70	106	142	178	214	4	2	3	1
35	71	107	143	179	215	5	2	3	6
36	72	108	144	180	216	6	2	3	5

POLARIZATION CODE	PLUGS (RACK) B KEY	RECEPTACLES (EQUIPMENT) B KEY
01 TO 36	1	4
37 TO 72	2	3
73 TO 108	3	2
109 TO 144	4	1
145 TO 180	5	6
181 TO 216	6	5



NOTE: DARK AREA REPRESENTS THE EXTENDED PART OF THE POLARIZATION DEVICE

POSITION NUMBER	KEY ORIENTATION
0	
1	
2	
3	
4	
5	
6	
7	



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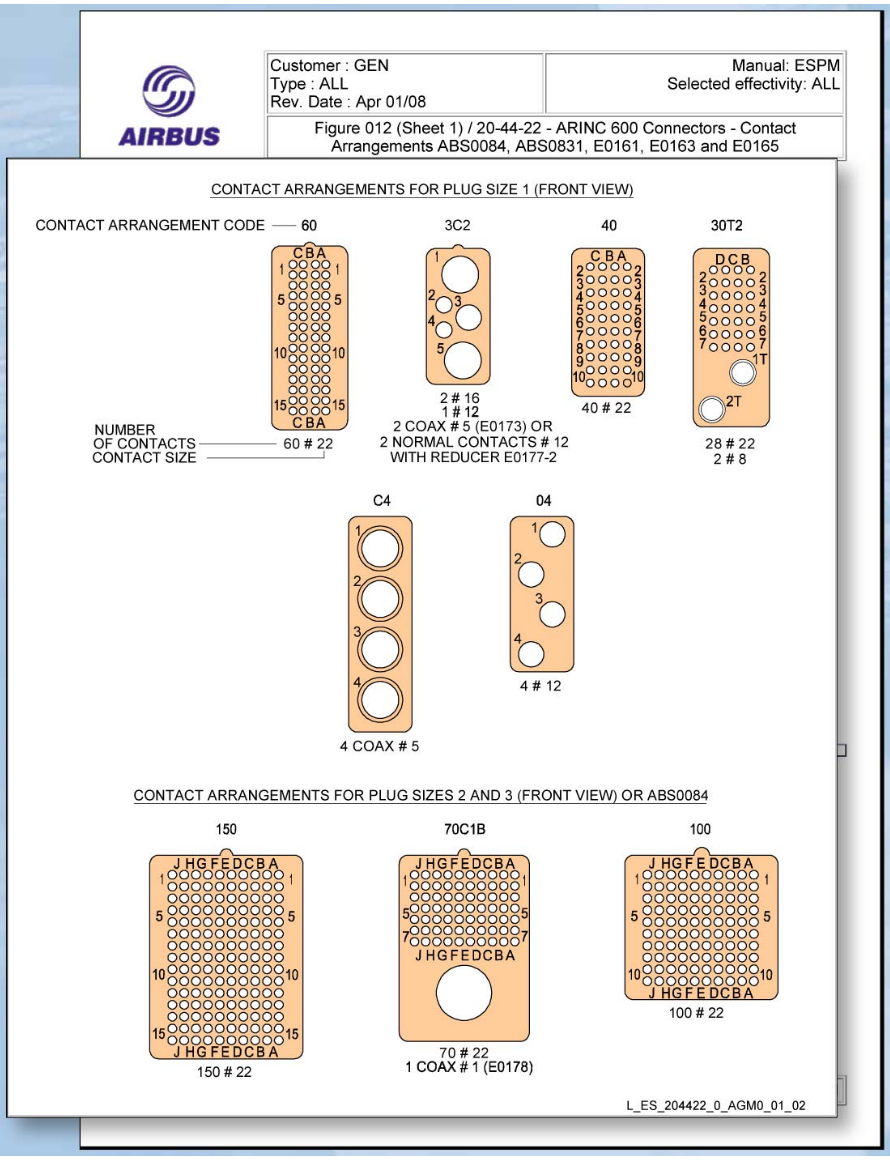
RECTANGULAR CONNECTORS

X8U08481 - X0332T0 - XM2032000000001



RECTANGULAR CONNECTORS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 016 (Sheet 1) / 20-44-22 - ARINC 600 Connectors - Connection Table

ELEMENTS		CONNECTION PROCEDURE XREF		
P/N	TYPE	CONNECTION TYPE MISCELLANEOUS	CONNECTION P/N MISCELLANEOUS P/N	ATA REF
ABS0084 ABS0831 E0161 E0163 E0165	PLUG	BY CONTACTS	* E0170FAXXXX * E0171LAXXXX	20-48-22
			*** ABS1381-22DLZXX	20-48-24
		BY COAXIAL CONTACTS	ABS1496-01XF * E0173SXXX **** E0178XXX **** E0201XX	20-48-31
			ABS0968-01 ABS1055S0100	20-48-34
		** BY GROUNDING CONTACTS	ABS0832LK1216 ABS0832KK1216	20-48-22
		SLEEVE	NSA937494 OR E0718	20-48-22
		BY TWINAX CONTACTS	ABS1111S01XX ABS1112P01XX	20-48-35
		BY QUADRAX CONTACTS	ABS0973M08A ABS0974F08A	20-48-36
		BY OPTICAL CONTACTS, ADAPTORS AND DUMMY ADAPTORS	ABS1379-003 ABS1379-004 ABS1379-005 ABS1379-006	20-48-91

* FOR SIZE 5, IF NECESSARY REPLACE BY A REDUCER E0177-2 WITH A NORMAL CONTACT E0170 OR E0171 SIZE 12.
** ONLY FOR ABS0831.
*** CONTACT FOR ALUMINUM CABLE.
**** USE ADAPTOR E0174 WITH COAXIAL CONTACT SIZE 01 (E0178 OR E0201).

NOTE: MANUFACTURER'S CONTACTS MUST BE INSTALLED ON SAME MANUFACTURER'S CONNECTORS.

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Figure 016 (Sheet 1) / 20-44-22 - ARINC 600 Connectors - Connection Table

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RECTANGULAR CONNECTORS

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
CONNECTORS TYPE PREN 3545 - DESCRIPTION AND OPERATION

1. General
Rectangular connectors installed on aircraft have the following codes:
E0390

1. General
Rectangular connectors installed on aircraft have the following codes:
E0390
EN3545

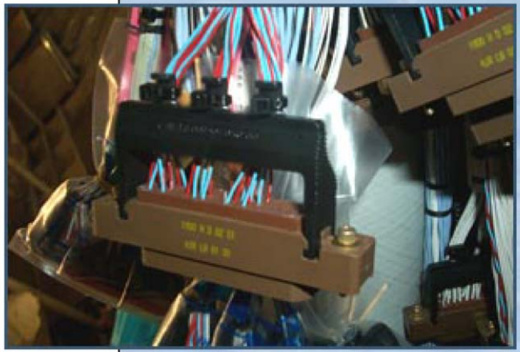
...dition

- Polarization code | Side A : item 1 | Side B : item 3
- Equipment code | A = female key | B = male key
- Rear sealing code | 1 = sealed rear side | 2 = non sealed rear side
- Contact type code | P = female connector male contacts | S = male connector female contacts
- Contact arrangement
- Contact size
- Material code = Thermoplastic resin
- Standard P/N

B. P/N characteristics

(1) Temperature
Minimum operating temperature is -55 deg.C (-67.00 deg.F).
Maximum operating temperature is 175 deg.C (347.00 deg.F).

(2) Delivery condition



EFF : ALL

20-44-24 Page 1 Oct 01/01

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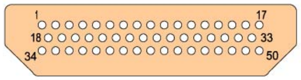
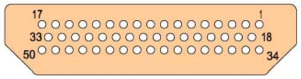
RECTANGULAR CONNECTORS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 004 (Sheet 1) / 20-44-24 - Connectors Type PREN3545 - Contact Arrangements E0390	

FEMALE CONNECTOR	
MALE CONNECTOR	
CONTACT ARRANGEMENT CODE	01
CONTACT NUMBER	50
WIRE OR CONTACT SIZE	20

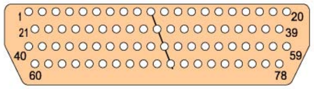
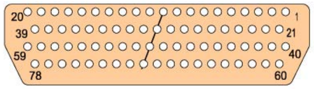
FEMALE CONNECTOR	
MALE CONNECTOR	
CONTACT ARRANGEMENT CODE	02
CONTACT NUMBER	78
WIRE OR CONTACT SIZE	22

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Figure 004 (Sheet 1) / 20-44-24 - Connectors Type PREN3545 - Contact Arrangements E0390

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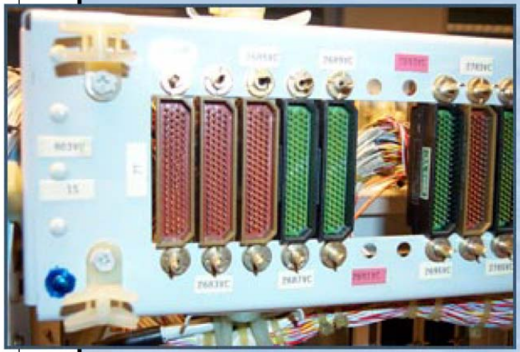
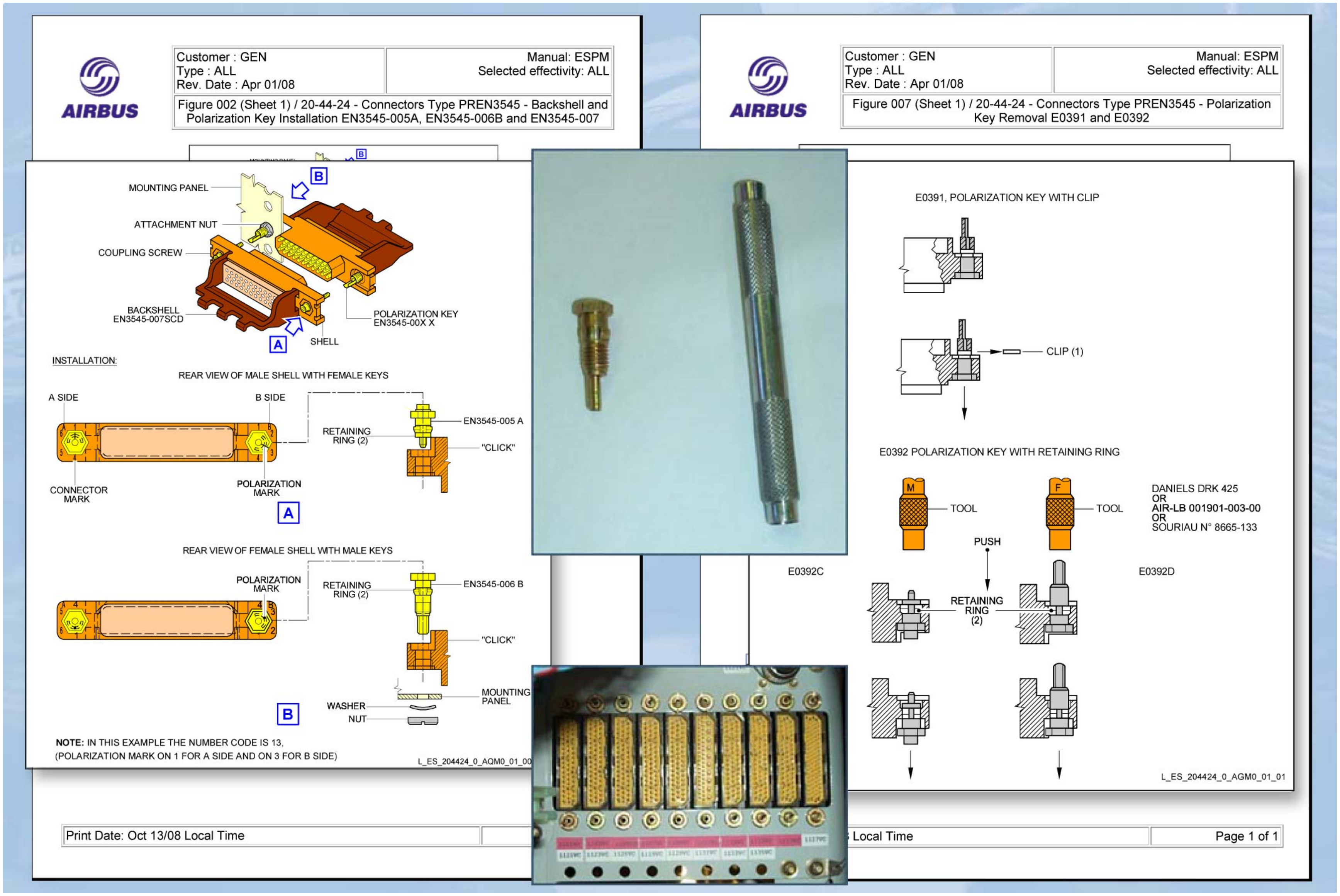


RECTANGULAR CONNECTORS

X8U08481 - X0332T0 - XM2032000000001

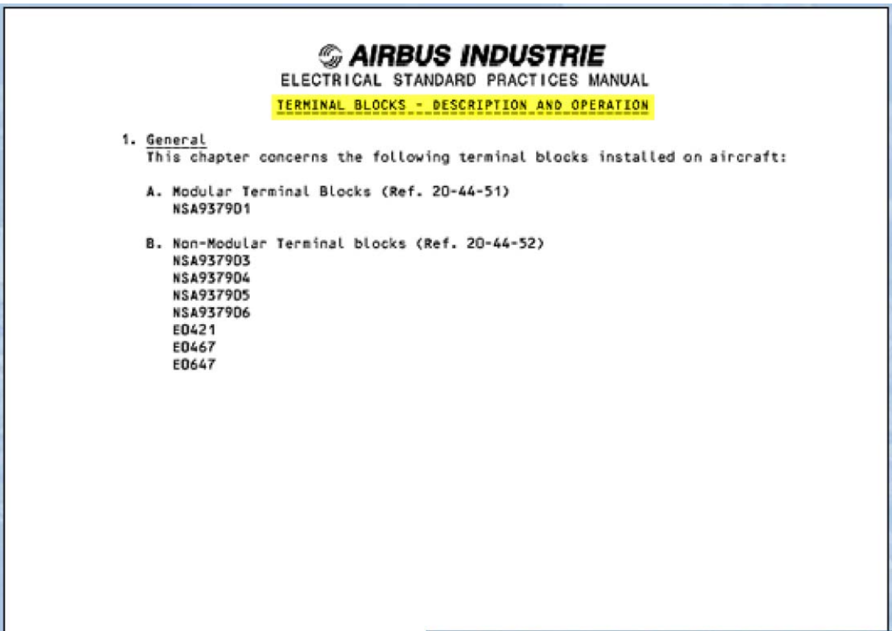


RECTANGULAR CONNECTORS

GENERAL TYPES AND IDENTIFICATION

MODULAR TERMINAL BLOCKS

This module concerns the following terminal blocks installed on aircraft:
Modular Terminal Blocks (NSA937901).
Example of full Part Number identification.
This Part Number identification comprises the Standard P/N, the type code and the Item number.
Terminal blocks - Schedule.
Type code.
The stud unit,
the cover,
the module identification,
the false module,
the shunt spacer,
the barrier,
the junction module,
the end plate,
the rail,
the end clamp,
the end clamp cover attachment,
the shunt.



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
TERMINAL BLOCKS - DESCRIPTION AND OPERATION

1. General
   This chapter concerns the following terminal blocks installed on aircraft:

   A. Modular Terminal Blocks (Ref. 20-44-51)
      NSA937901

   B. Non-Modular Terminal blocks (Ref. 20-44-52)
      NSA937903
      NSA937904
      NSA937905
      NSA937906
      E0421
      E0467
      E0647

EFF : ALL

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MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

MODULAR TERMINAL BLOCKS - DESCRIPTION AND OPERATION

1. General
R Modular terminal block elements installed on aircraft have the following
R code:
NSA937901.

R 2. NSA937901 Modular Terminal Block Elements
R

R A. P/N identification
R (Ref. Fig. 001)

```
NSA937901  R  0085
    |      |   |
    |      |   |
    |      |   ------------------ Item Number
    |      |
    |      ---------------------- Type code
    |
    ----------------------------- Standard P/N
```

R

R B. P/N characteristics
R

R (1) Temperature
Minimum operating temperature is -50 deg.C (-58.00 deg.F).
Maximum operating temperature is 175 deg.C (347.00 deg.F).
R

R C. Description

R (1) Complete assembly.
R (Ref. Fig. 002)

R (2) Element layout.
R (Ref. Fig. 003, 004)

EFF : ALL

20-44-51 Page 1
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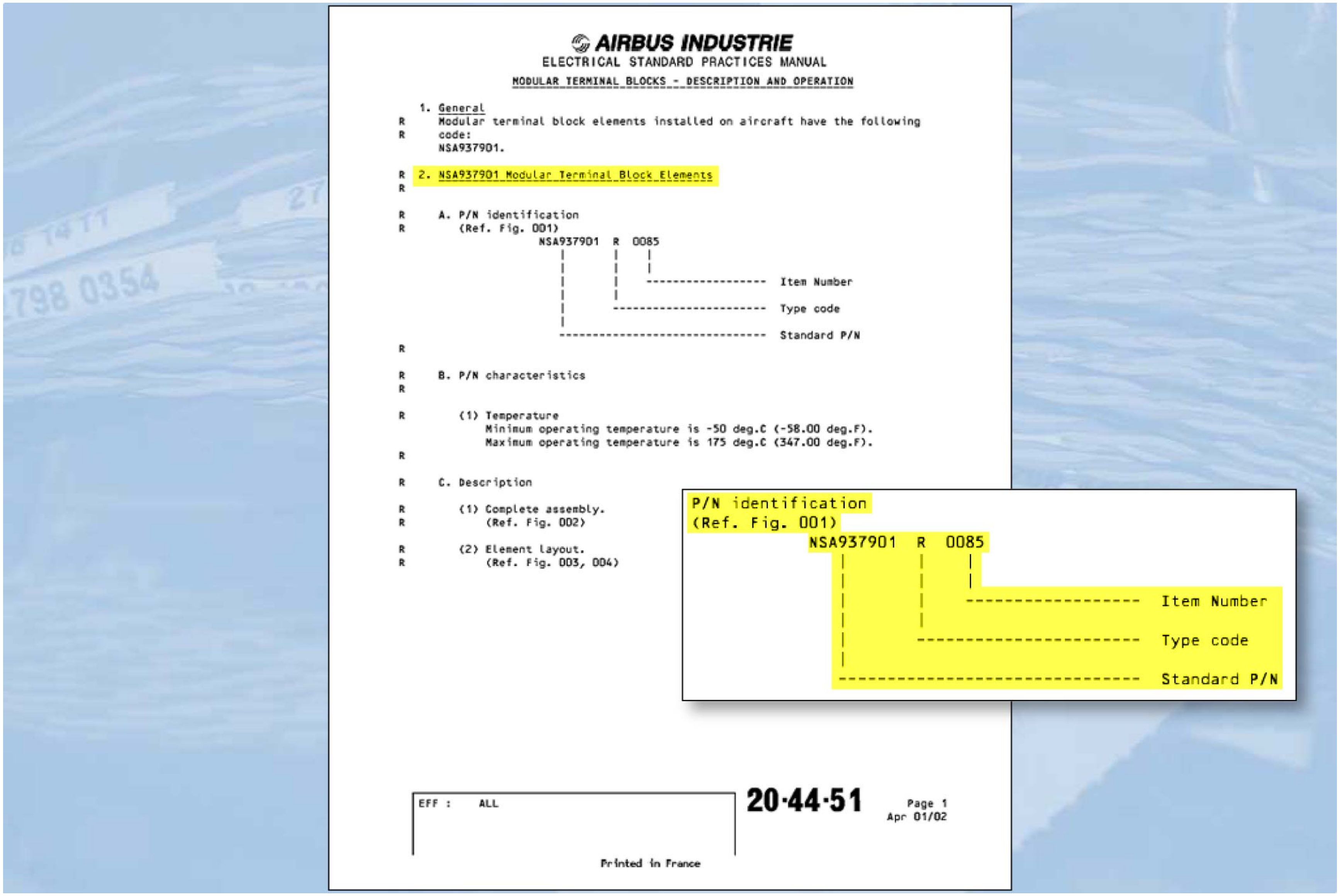
MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
MODULAR TERMINAL BLOCKS - DESCRIPTION AND OPERATION

1. General
R Modular terminal block elements installed on aircraft have the following
R code:
NSA937901.

R 2. NSA937901 Modular Terminal Block Elements
R

R A. P/N identification
R (Ref. Fig. 001)

```
NSA937901  R  0085
    |      |   |
    |      |   |
    |      |   ------------------  Item Number
    |      |
    |      -----------------------  Type code
    |
    ------------------------------  Standard P/N
```

R

R B. P/N characteristics
R

R (1) Temperature
Minimum operating temperature is -50 deg.C (-58.00 deg.F).
Maximum operating temperature is 175 deg.C (347.00 deg.F).
R

R C. Description

R (1) Complete assembly.
R (Ref. Fig. 002)

R (2) Element layout.
R (Ref. Fig. 003, 004)

EFF : ALL

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P/N identification
(Ref. Fig. 001)

```
NSA937901  R  0085
    |      |   |
    |      |   |
    |      |   ------------------  Item Number
    |      |
    |      -----------------------  Type code
    |
    ------------------------------  Standard P/N
```

MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

EG: NSA937901 R 0085
- ITEM NO. (0085)
- TYPE CODE (R)
- STANDARD P/N (NSA937901)

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20:CONTACT SIZE M => 22,20,16,12 MA => 22,20 01:CONTACT ARRANGEMENT CODE
	MA	20-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm.
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

SIS 20 44 51 0 AANO 09

R Modular Terminal Blocks - P/N Identification
NSA937901
Figure 001

EFF : ALL

20·44·51

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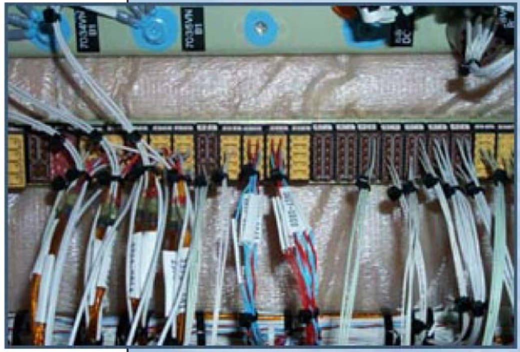
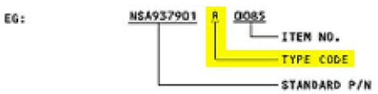


MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL



ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20:CONTACT SIZE M => 22,20,16,12 MA => 22,20 01:CONTACT ARRANGEMENT CODE
	MA	20-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm.
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

SIS 20 44 51 0 AANO 09

R

Modular Terminal Blocks - P/N Identification
NSA937901
Figure 001

EFF : ALL

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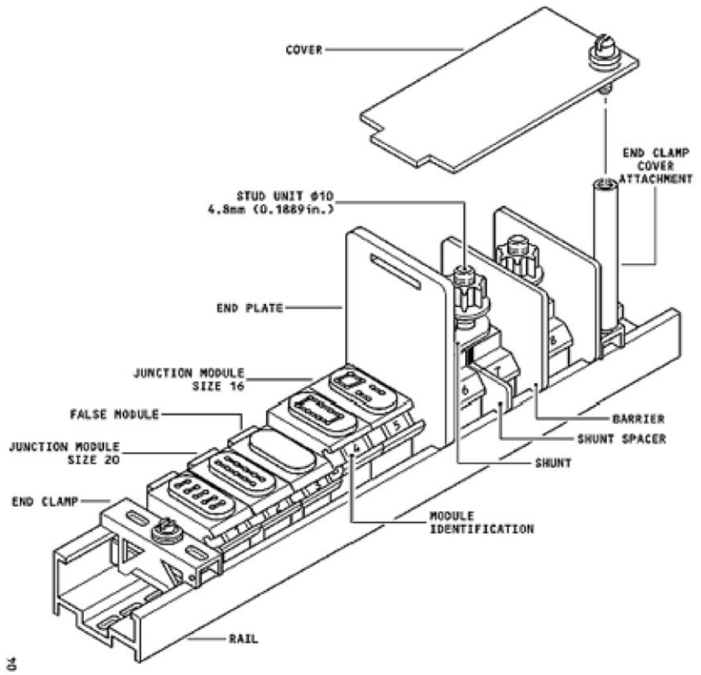
AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL



SIS 20 44 51 0 ACNO 04

R

Modular Terminal Blocks - Complete Assembly
NSA937901
Figure 002

EFF : ALL

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X8U08481 - X0332T0 - XM2032000000001

MODULAR TERMINAL BLOCKS

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

EG: NSA937901 R 0085
- ITEM NO. (0085)
- TYPE CODE (R)
- STANDARD P/N (NSA937901)

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20:CONTACT SIZE M => 22,20,16,12 MA => 22,20 01:CONTACT ARRANGEMENT CODE
	MA	20-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm.
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

SIS 20 44 51 0 AAMO 09

R

Modular Terminal Blocks - P/N Identification
NSA937901
Figure 001

EFF : ALL

20-44-51

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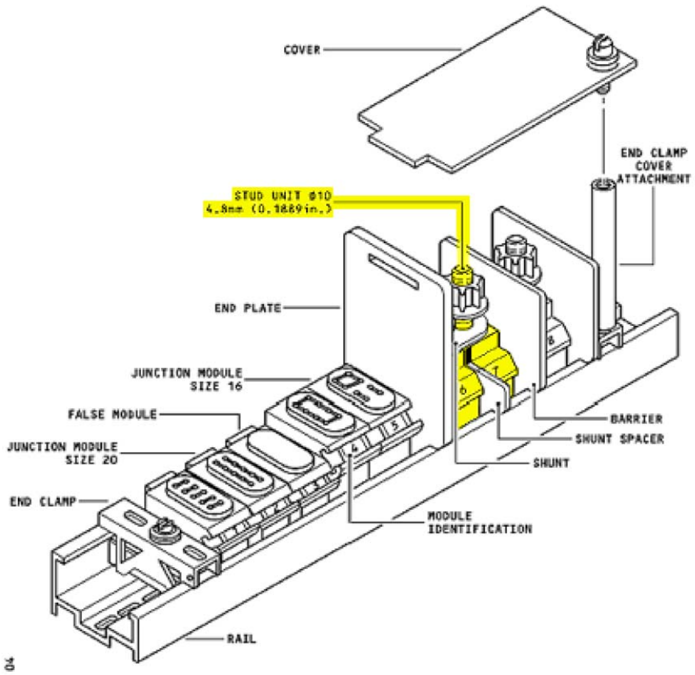
ELECTRICAL STANDARD PRACTICES MANUAL



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R

Modular Terminal Blocks - Complete Assembly
NSA937901
Figure 002

EFF : ALL

20-44-51

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MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

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ELECTRICAL STANDARD PRACTICES MANUAL

EG: NSA937901 R 0085
- ITEM NO.
- TYPE CODE
- STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20:CONTACT SIZE M => 22,20,16,12 MA => 22,20 01:CONTACT ARRANGEMENT CODE
	MA	20-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm.
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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R Modular Terminal Blocks - P/N Identification
NSA937901
Figure 001

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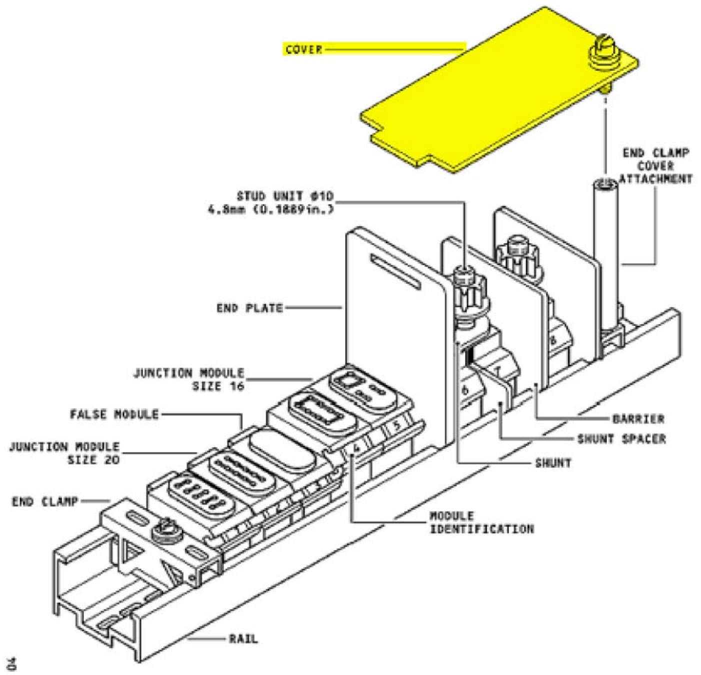

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R Modular Terminal Blocks - Complete Assembly
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Figure 002

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	MA	20-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm.
	RA	XXXX	
	RB	XXXX	
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Modular Terminal Blocks - P/N Identification
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Figure 001

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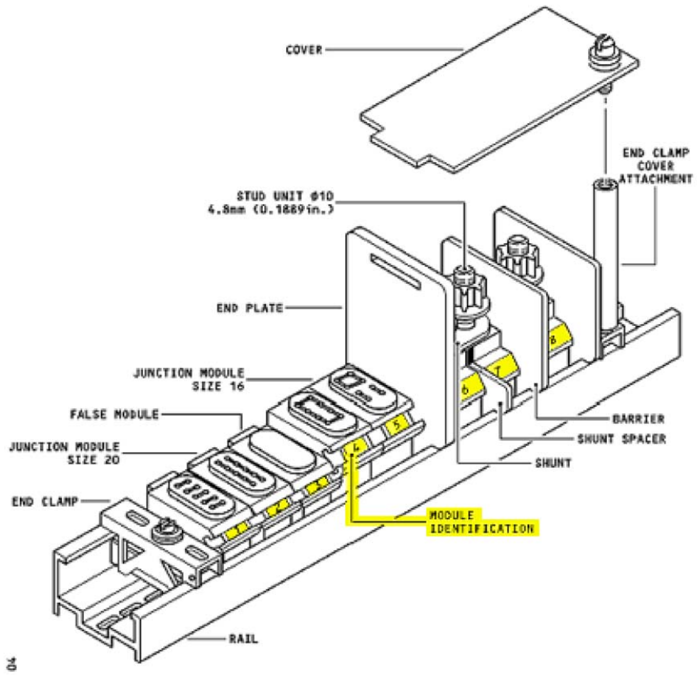

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MODULAR TERMINAL BLOCKS

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	RA	XXXX	
	RB	XXXX	
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	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Modular Terminal Blocks - P/N Identification
NSA937901
Figure 001

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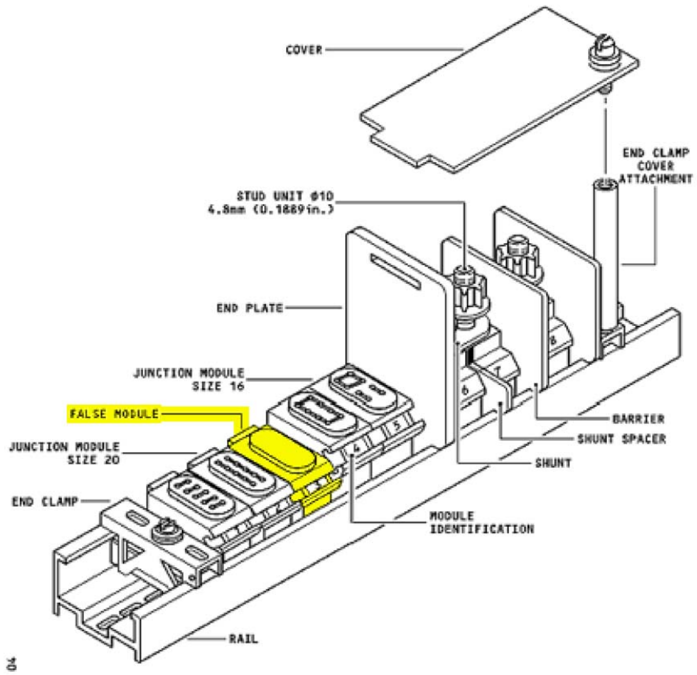

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NSA937901
Figure 002

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ELECTRICAL STANDARD PRACTICES MANUAL

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- TYPE CODE
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	RB	XXXX	
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END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
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SHUNT	SH	5	NUMBER OF HOLES

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R Modular Terminal Blocks - P/N Identification
NSA937901
Figure 001

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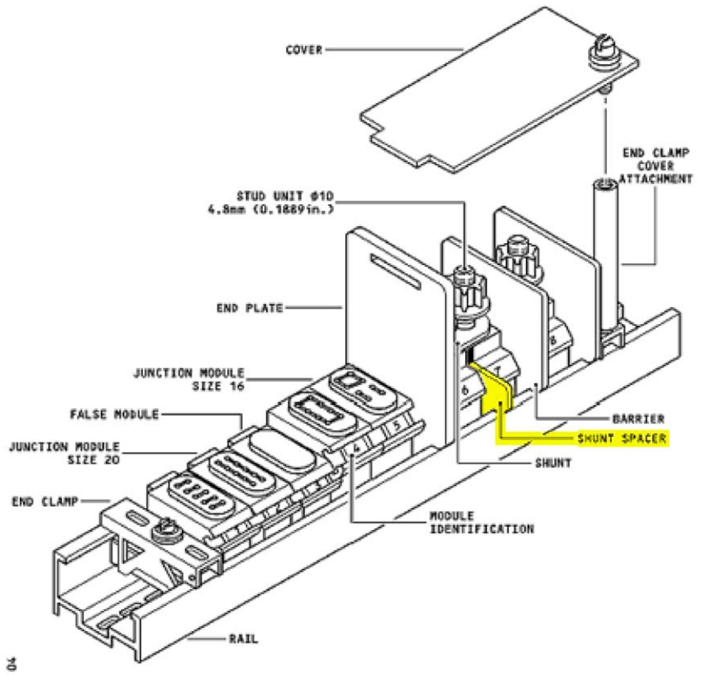

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R Modular Terminal Blocks - Complete Assembly
NSA937901
Figure 002

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MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

EG: NSA937901 R 0085
- ITEM NO. (0085)
- TYPE CODE (R)
- STANDARD P/N (NSA937901)

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
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	RB	XXXX	
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	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Modular Terminal Blocks - P/N Identification
NSA937901
Figure 001

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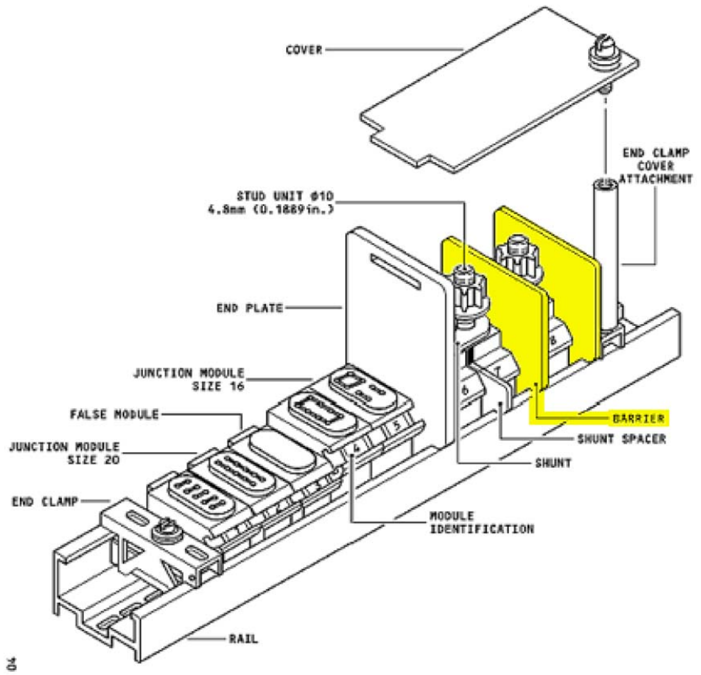

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Modular Terminal Blocks - Complete Assembly
NSA937901
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MODULAR TERMINAL BLOCKS

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ELECTRICAL STANDARD PRACTICES MANUAL

EG: NSA937901 R 0085
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ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
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SHUNT	SH	5	NUMBER OF HOLES

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R Modular Terminal Blocks - P/N Identification
NSA937901
Figure 001

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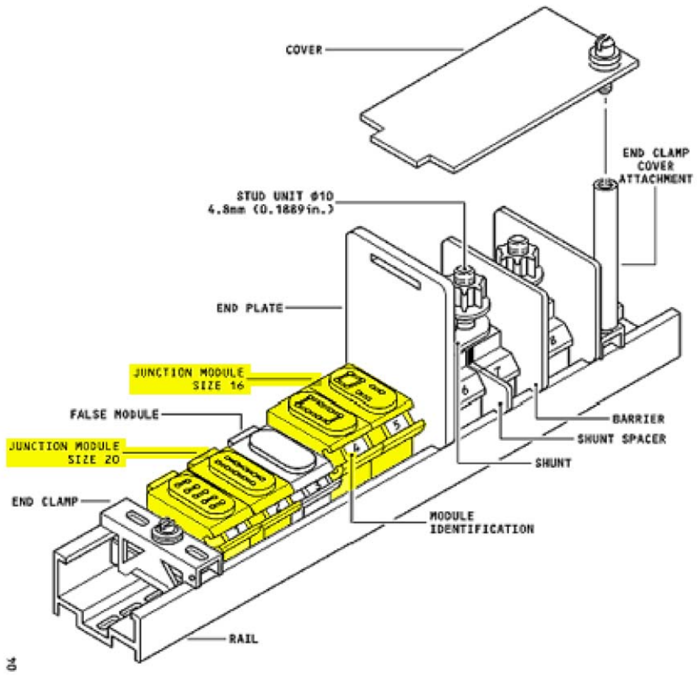

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R Modular Terminal Blocks - Complete Assembly
NSA937901
Figure 002

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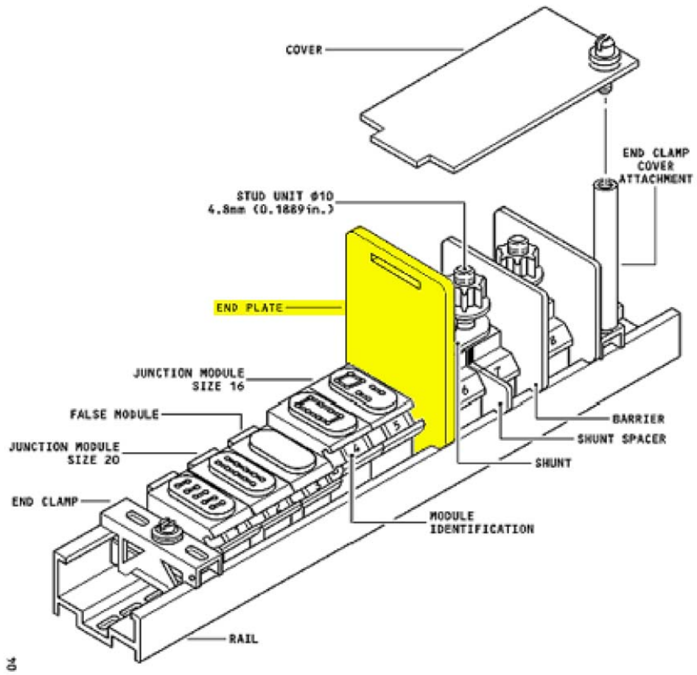

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Modular Terminal Blocks - Complete Assembly
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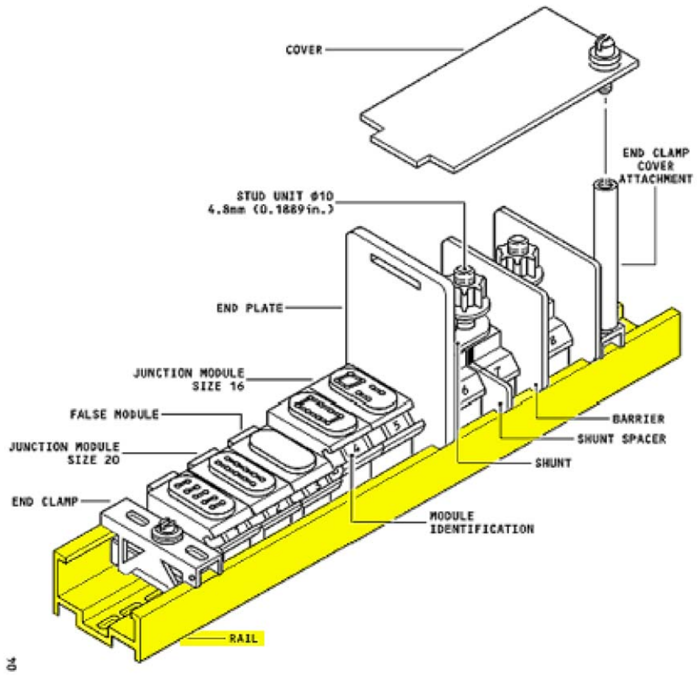

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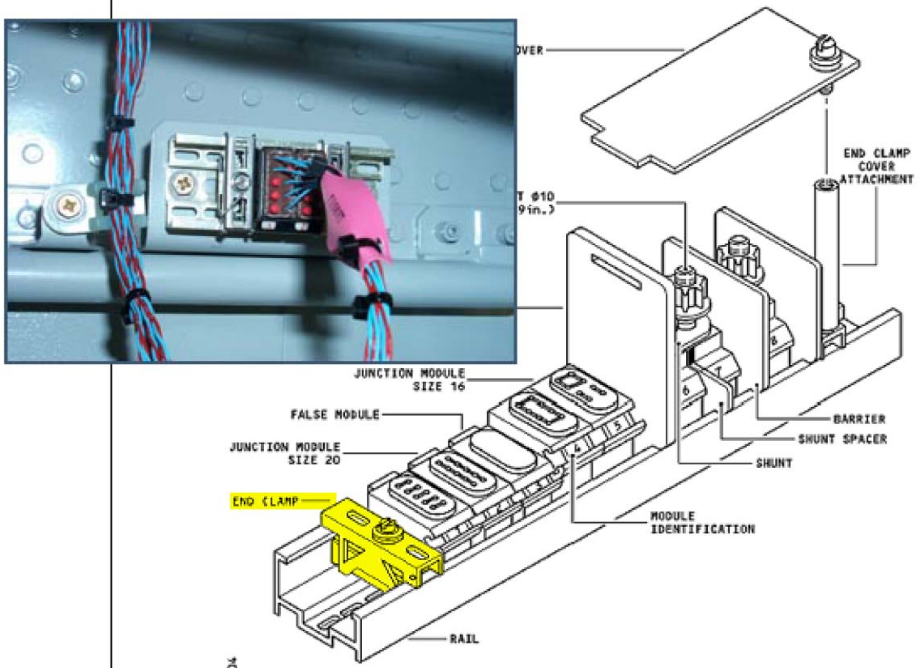

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Modular Terminal Blocks - Complete Assembly
NSA937901
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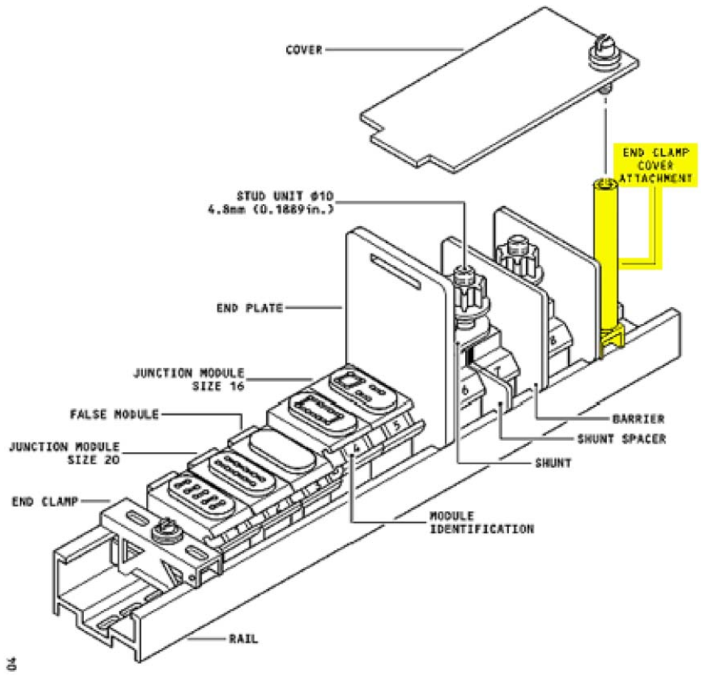

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NSA937901
Figure 001

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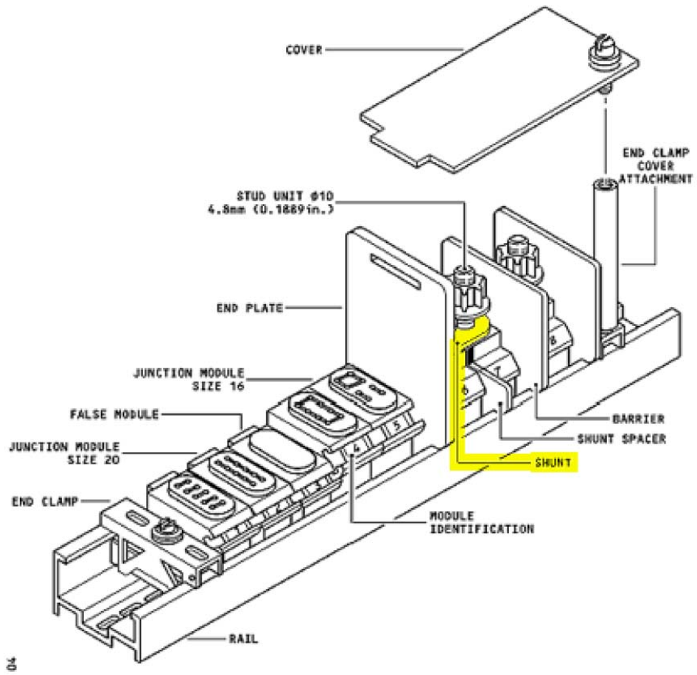

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Modular Terminal Blocks - Complete Assembly
NSA937901
Figure 002

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MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

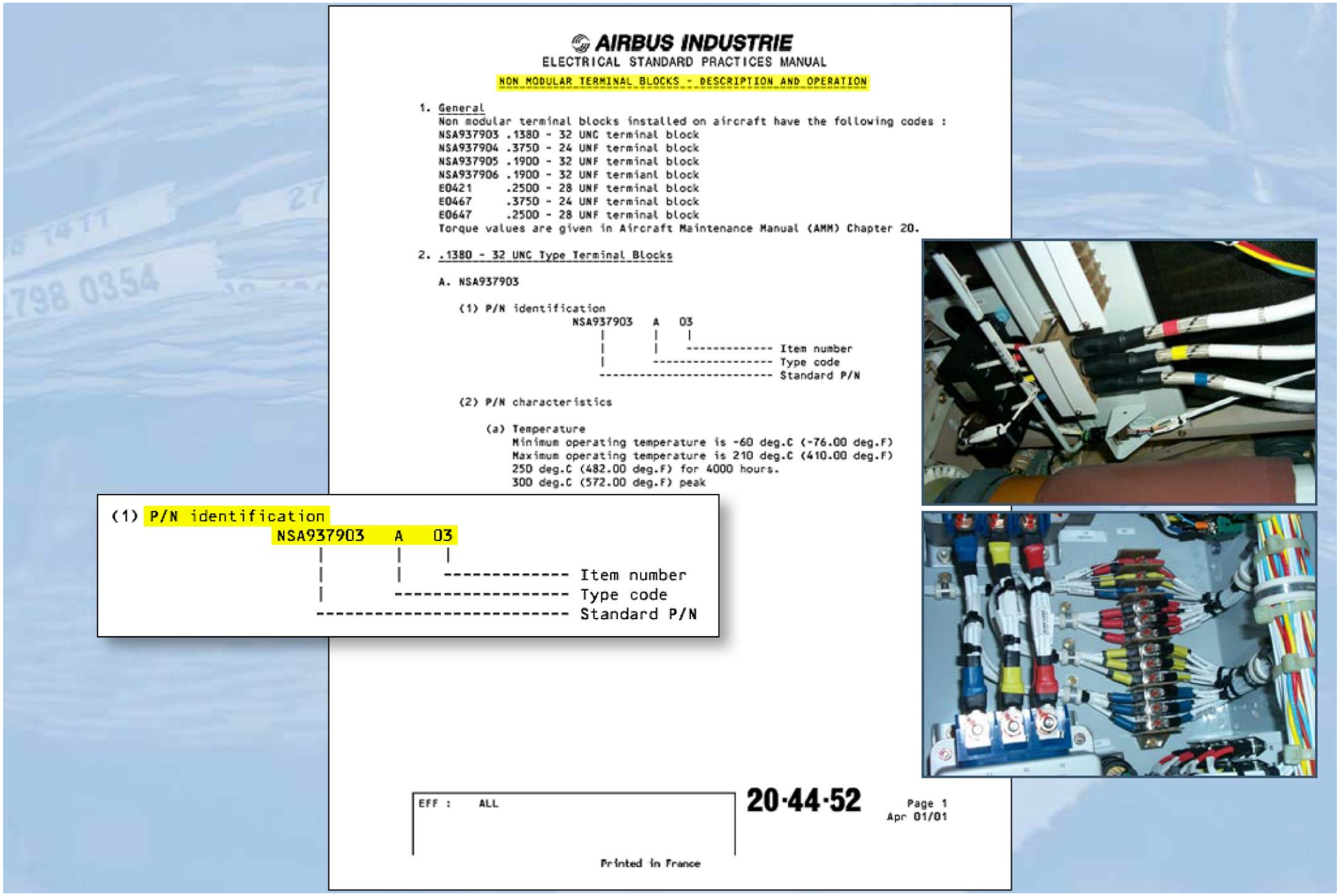
GENERAL TYPES AND IDENTIFICATION

NON MODULAR TERMINAL BLOCKS

Example of non modular terminal blocks installed on aircraft:
- NSA937903.

A non modular terminal block generally comprises:
- the cover,
- the pillar bolts,
- a spacer (if necessary),
- a shunt.

Torque values depend on the P/N. Here are some examples.



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ELECTRICAL STANDARD PRACTICES MANUAL

NON MODULAR TERMINAL BLOCKS - DESCRIPTION AND OPERATION

1. General

Non modular terminal blocks installed on aircraft have the following codes :

NSA937903 .1380 - 32 UNC terminal block
NSA937904 .3750 - 24 UNF terminal block
NSA937905 .1900 - 32 UNF terminal block
NSA937906 .1900 - 32 UNF termianl block
E0421 .2500 - 28 UNF terminal block
E0467 .3750 - 24 UNF terminal block
E0647 .2500 - 28 UNF terminal block

Torque values are given in Aircraft Maintenance Manual (AMM) Chapter 20.

2. .1380 - 32 UNC Type Terminal Blocks

A. NSA937903

(1) P/N identification

```
NSA937903   A   03
    |       |   |
    |       |   ------------- Item number
    |       ----------------- Type code
    ------------------------- Standard P/N
```

(2) P/N characteristics

(a) Temperature

Minimum operating temperature is -60 deg.C (-76.00 deg.F)
Maximum operating temperature is 210 deg.C (410.00 deg.F)
250 deg.C (482.00 deg.F) for 4000 hours.
300 deg.C (572.00 deg.F) peak

(1) P/N identification

```
NSA937903   A   03
    |       |   |
    |       |   ------------- Item number
    |       ----------------- Type code
    ------------------------- Standard P/N
```

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NON MODULAR TERMINAL BLOCKS

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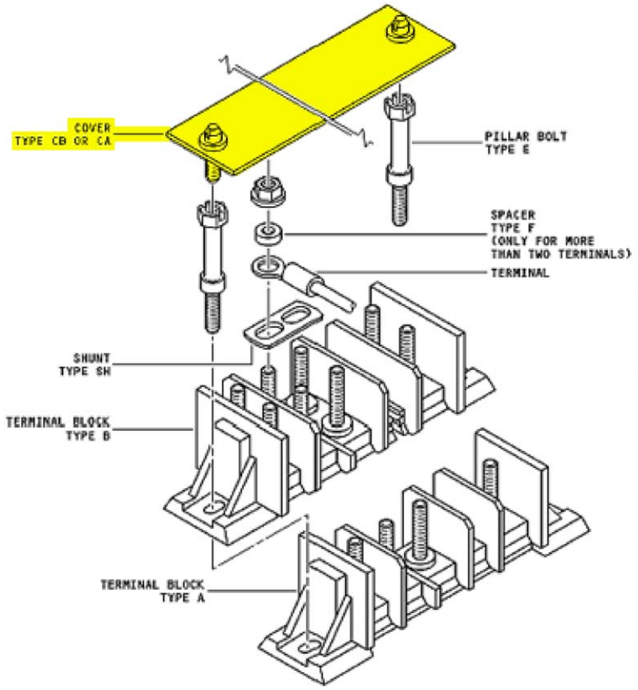

S15 20 44 52 0 AANO 04

TORQUE VALUE					
CONNECTION		ATTACHEMENT		COVER SCREW	
MINI	MAX	MINI	MAX	MINI	MAX
0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbft.in)	0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbft.in)	0.08 m.daN (7.07 lbf.in)	0.10 m.daN (8.84 lbf.in)

1380 - 32 UNC Type Terminal Blocks- Complete Assembly
NSA937903
Figure 001

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NON MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

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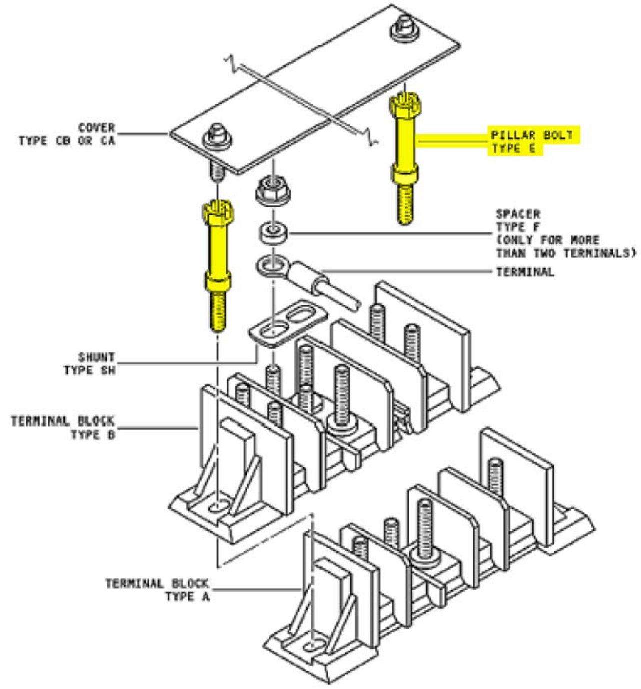
ELECTRICAL STANDARD PRACTICES MANUAL



SIS 20 44 52 0 AAMO 04

TORQUE VALUE					
CONNECTION		ATTACHEMENT		COVER SCREW	
MINI	MAX	MINI	MAX	MINI	MAX
0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbft.in)	0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbft.in)	0.08 m.daN (7.07 lbf.in)	0.10 m.daN (8.84 lbf.in)

1380 - 32 UNC Type Terminal Blocks- Complete Assembly
NSA937903
Figure 001

EFF : ALL

20·44·52

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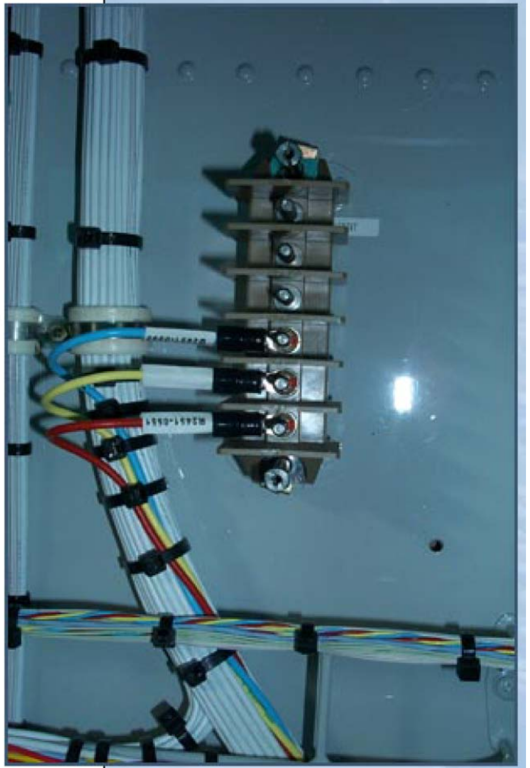

NON MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

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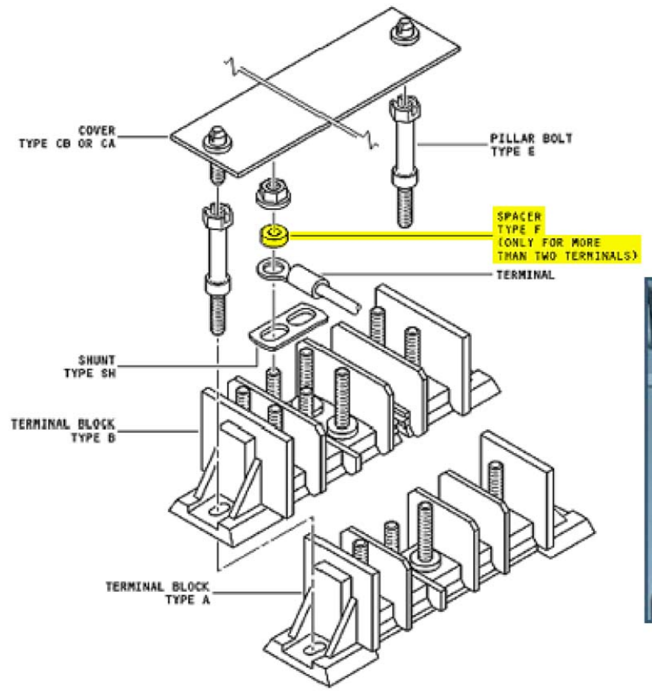
ELECTRICAL STANDARD PRACTICES MANUAL



S15 20 44 52 0 AAM0 04

TORQUE VALUE					
CONNECTION		ATTACHEMENT		COVER SCREW	
MINI	MAX	MINI	MAX	MINI	MAX
0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbft.in)	0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbft.in)	0.08 m.daN (7.07 lbf.in)	0.10 m.daN (8.84 lbf.in)

138D - 32 UNC Type Terminal Blocks- Complete Assembly
NSA937903
Figure 001

EFF : ALL

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NON MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2032000000001

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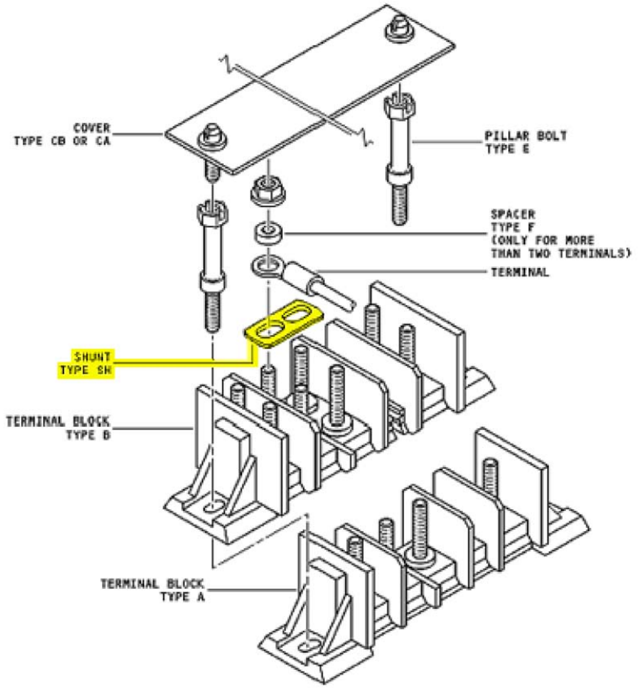

SI5 20 44 52 0 AAMO 04

TORQUE VALUE					
CONNECTION		ATTACHEMENT		COVER SCREW	
MINI	MAX	MINI	MAX	MINI	MAX
0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbft.in)	0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbft.in)	0.08 m.daN (7.07 lbf.in)	0.10 m.daN (8.84 lbf.in)

1380 - 32 UNC Type Terminal Blocks- Complete Assembly
NSA937903
Figure 001

EFF : ALL

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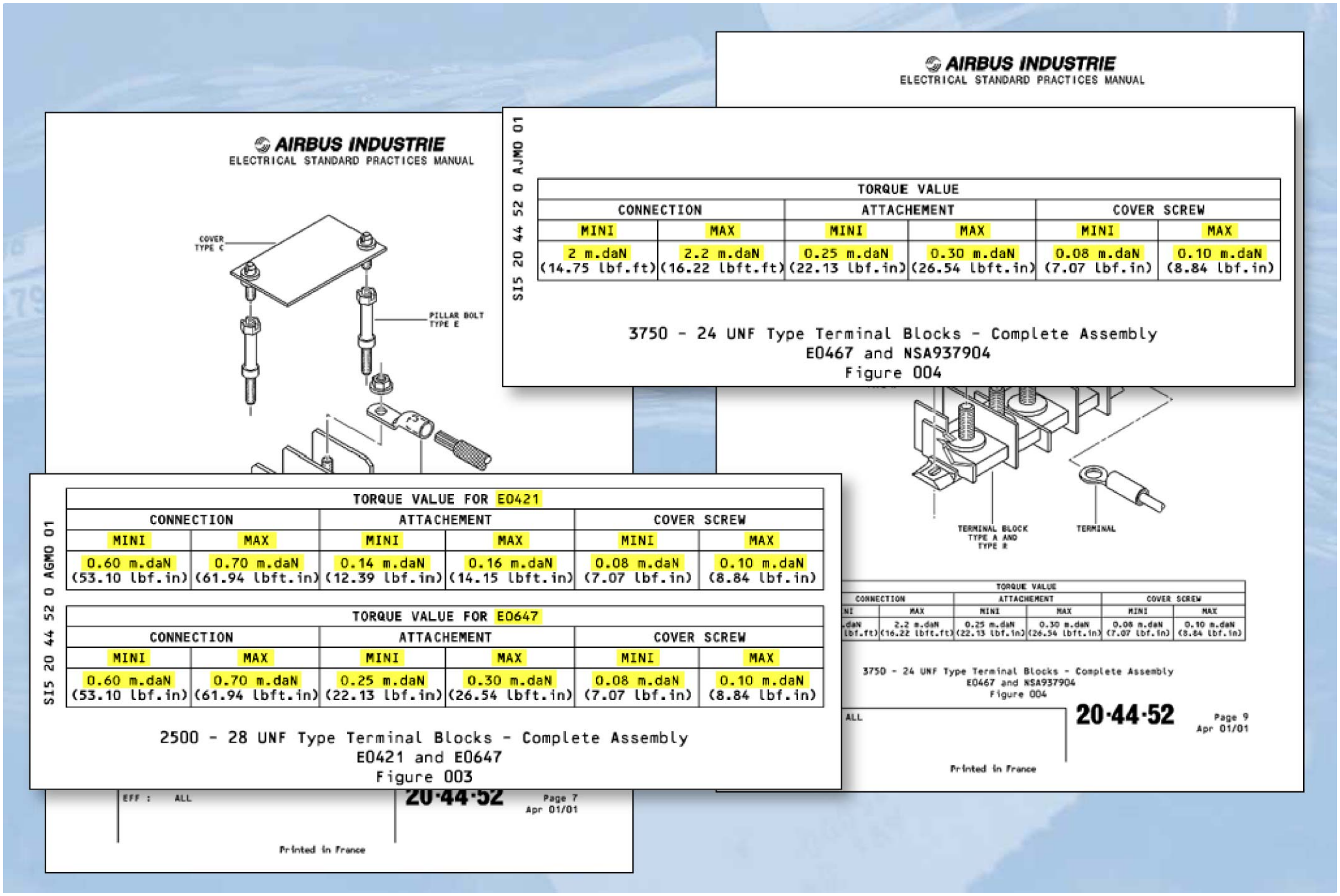
NON MODULAR TERMINAL BLOCKS



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

SI5 20 44 52 0 AJMO 01

TORQUE VALUE					
CONNECTION		ATTACHEMENT		COVER SCREW	
MINI	MAX	MINI	MAX	MINI	MAX
2 m.daN (14.75 lbf.ft)	2.2 m.daN (16.22 lbf.ft)	0.25 m.daN (22.13 lbf.in)	0.30 m.daN (26.54 lbf.in)	0.08 m.daN (7.07 lbf.in)	0.10 m.daN (8.84 lbf.in)

3750 - 24 UNF Type Terminal Blocks - Complete Assembly
E0467 and NSA937904
Figure 004

SI5 20 44 52 0 AGMO 01

TORQUE VALUE FOR E0421					
CONNECTION		ATTACHEMENT		COVER SCREW	
MINI	MAX	MINI	MAX	MINI	MAX
0.60 m.daN (53.10 lbf.in)	0.70 m.daN (61.94 lbft.in)	0.14 m.daN (12.39 lbf.in)	0.16 m.daN (14.15 lbf.in)	0.08 m.daN (7.07 lbf.in)	0.10 m.daN (8.84 lbf.in)

TORQUE VALUE FOR E0647					
CONNECTION		ATTACHEMENT		COVER SCREW	
MINI	MAX	MINI	MAX	MINI	MAX
0.60 m.daN (53.10 lbf.in)	0.70 m.daN (61.94 lbft.in)	0.25 m.daN (22.13 lbf.in)	0.30 m.daN (26.54 lbft.in)	0.08 m.daN (7.07 lbf.in)	0.10 m.daN (8.84 lbf.in)

2500 - 28 UNF Type Terminal Blocks - Complete Assembly
E0421 and E0647
Figure 003

NON MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM203200000001

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GENERAL TYPES AND IDENTIFICATION

GROUNDING MODULES

The grounding modules installed on aircraft have the following PN:
- E0425,
- NSA937916.

The E0425 grounding modules are directly installed on the aircraft structure.
The P/N identification is divided into:
- the standard P/N,
- the type code,
- the contact size,
- the arrangement code.

There is no locating number on a grounding module to indicate into which cavity grounding wire must be connected. The own identification number is the grounding module itself (5124VG B1 for example on the picture).
The connection type is given in the CONNECTION PROCEDURE paragraph.
In this case you must connect with a contact E0396. All the details (Shrinking, insertion/extraction, and crimping tools) are given in 20-48-21 Chapter.

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
GROUNDING MODULE - DESCRIPTION AND OPERATION

1. General
   Grounding modules installed on aircraft have the following codes:
   - E0425 grounding module installed on struture.
   - NSA937916 grounding module installed on rail.

2. Grounding module

   A. E0425

      (1) P/N identification
          (Ref. Fig. 001)

```
E0425 A 20 01
----  - -- --
  |   | |  |_______________Arrangement code
  |   | |__________________Contact size
  |   |____________________Type code
  |________________________Standard P/N
```

      (2) P/N characteristics

          (a) Temperature
              Minimum operating temperature is -55 deg.C (-67.00 deg.F)
              Maximum operating temperature is 125 deg.C (257.00 deg.F)

   B. NSA937916

      (1) P/N identification
          (Ref. Fig. 002)

```
NSA937916-16
    |      |_______________Type code
    |______________________Standard P/N
```

      (2) P/N charasteristics
MODULE NSA937916-XX

TYPE	NUMBER OF CONTACTS	SUPPORT CODE
16	8	16
20	10	20

EFF : ALL

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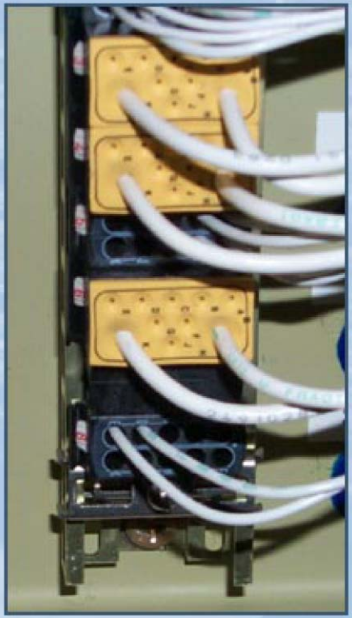
E0425



NSA937916

GROUNDING MODULES

X8U08481 - X0332T0 - XM203200000001

GROUNDING MODULES

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

GROUNDING MODULE - DESCRIPTION AND OPERATION

1. General
Grounding modules installed on aircraft have the following codes:
- E0425 grounding module installed on struture.
- NSA937916 grounding module installed on rail.

2. Grounding module

A. E0425

(1) P/N identification
(Ref. Fig. 001)

```
E0425 A 20 01
---- - -- --
  |  | |  |_______________Arrangement code
  |  | |__________________Contact size
  |  |____________________Type code
  |_______________________Standard P/N
```

(2) P/N characteristics

(a) Temperature
Minimum operating te
Maximum operating te

B. NSA937916

(1) P/N identification
(Ref. Fig. 002)
NSA937916-1

(2) P/N charasteristics
MODULE NSA937916-XX

TYPE	NUMBER OF CONTACTS	SUPPORT CODE
16	8	16
20	10	20

EFF : ALL

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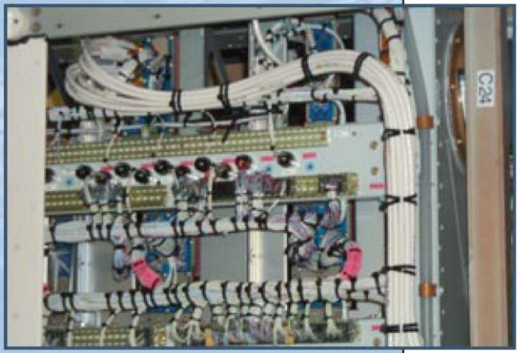
P/N identification
(Ref. Fig. 001)

```
E0425 A 20 01
---- - -- --
  |  | |  |_______________Arrangement code
  |  | |__________________Contact size
  |  |____________________Type code
  |_______________________Standard P/N
```


GROUNDING MODULES



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ELECTRICAL STANDARD PRACTICES MANUAL
GROUNDING MODULE - DESCRIPTION AND OPERATION

1. General
Grounding modules installed on aircraft have the following codes:
- E0425 grounding module installed on struture.
- NSA937916 grounding module installed on rail.

2. Grounding module

A. E0425

(1) P/N identification
(Ref. Fig. 001)

```
E0425 A 20 01
----  - -- --
  |   | |  |_______________Arrangement code
  |   | |__________________Contact size
  |   |____________________Type code
  |________________________Standard P/N
```

(2) P/N characteristics

(a) Temperature
Minimum operating te
Maximum operating te

B. NSA937916

(1) P/N identification
(Ref. Fig. 002)
NSA937916-1

(2) P/N charasteristics
MODULE NSA937916-XX

TYPE	NUMBER OF CONTACTS	SUPPORT CODE
16	8	16
20	10	20

EFF : ALL

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P/N identification
(Ref. Fig. 001)

```
E0425 A 20 01
----  - -- --
  |   | |  |_______________Arrangement code
  |   | |__________________Contact size
  |   |____________________Type code
  |________________________Standard P/N
```

GROUNDING MODULES

X8U08481 - X0332T0 - XM20320000000001

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

GROUNDING MODULE - DESCRIPTION AND OPERATION

1. General
   Grounding modules installed on aircraft have the following codes:
   - E0425 grounding module installed on struture.
   - NSA937916 grounding module installed on rail.

2. Grounding module

   A. E0425

      (1) P/N identification
          (Ref. Fig. 001)

```
E0425 A 20 01
---- - -- --
  |  | |  |_______________Arrangement code
  |  | |__________________Contact size
  |  |____________________Type code
  |_______________________Standard P/N
```

      (2) P/N characteristics

          (a) Temperature
              Minimum operating te
              Maximum operating te

   B. NSA937916

      (1) P/N identification
          (Ref. Fig. 002)
          NSA937916-1

      (2) P/N charasteristics
   MODULE NSA937916-XX

TYPE	NUMBER OF CONTACTS	SUPPORT CODE
16	8	16
20	10	20

EFF : ALL

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P/N identification
(Ref. Fig. 001)

```
E0425 A 20 01
---- - -- --
  |  | |  |_______________Arrangement code
  |  | |__________________Contact size
  |  |____________________Type code
  |_______________________Standard P/N
```

GROUNDING MODULES

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

GROUNDING MODULE - DESCRIPTION AND OPERATION

1. General
Grounding modules installed on aircraft have the following codes:
- E0425 grounding module installed on struture.
- NSA937916 grounding module installed on rail.

2. Grounding module

A. E0425

(1) P/N identification
(Ref. Fig. 001)

```
E0425 A 20 01
---- - -- --
  |  | |  |_______________Arrangement code
  |  | |__________________Contact size
  |  |____________________Type code
  |_______________________Standard P/N
```

(2) P/N characteristics

(a) Temperature
Minimum operating te
Maximum operating te

B. NSA937916

(1) P/N identification
(Ref. Fig. 002)
NSA937916-1

(2) P/N charasteristics
MODULE NSA937916-XX

TYPE	NUMBER OF CONTACTS	SUPPORT CODE
16	8	16
20	10	20

P/N identification
(Ref. Fig. 001)

```
E0425 A 20 01
---- - -- --
  |  | |  |_______________Arrangement code
  |  | |__________________Contact size
  |  |____________________Type code
  |_______________________Standard P/N
```

EFF : ALL

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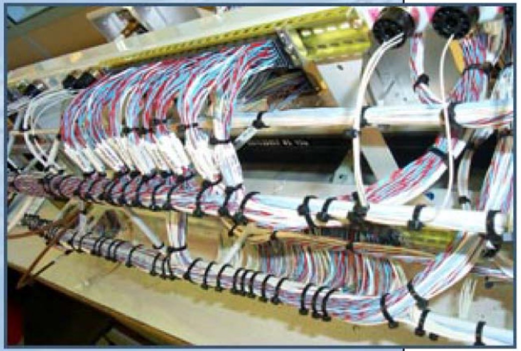
GROUNDING MODULES

X8U08481 - X0332T0 - XM203200000001



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ELECTRICAL STANDARD PRACTICES MANUAL

GROUNDING MODULE - DESCRIPTION AND OPERATION

1. General
   Grounding modules installed on aircraft have the following codes:
   - E0425 grounding module installed on struture.
   - NSA937916 grounding module installed on rail.

2. Grounding module

   A. E0425

      (1) P/N identification
          (Ref. Fig. 001)

```
E0425 A 20 01
----  - -- --
  |   |  |  |______________Arrangement code
  |   |  |_________________Contact size
  |   |____________________Type code
  |________________________Standard P/N
```

      (2) P/N characteristics

          (a) Temperature
              Minimum operating te
              Maximum operating te

   B. NSA937916

      (1) P/N identification
          (Ref. Fig. 002)
          NSA937916-1

      (2) P/N charasteristics
MODULE NSA937916-XX

TYPE	NUMBER OF CONTACTS	SUPPORT CODE
16	8	16
20	10	20

P/N identification
(Ref. Fig. 001)

```
E0425 A 20 01
----  - -- --
  |   |  |  |______________Arrangement code
  |   |  |_________________Contact size
  |   |____________________Type code
  |________________________Standard P/N
```

EFF : ALL

20-44-71

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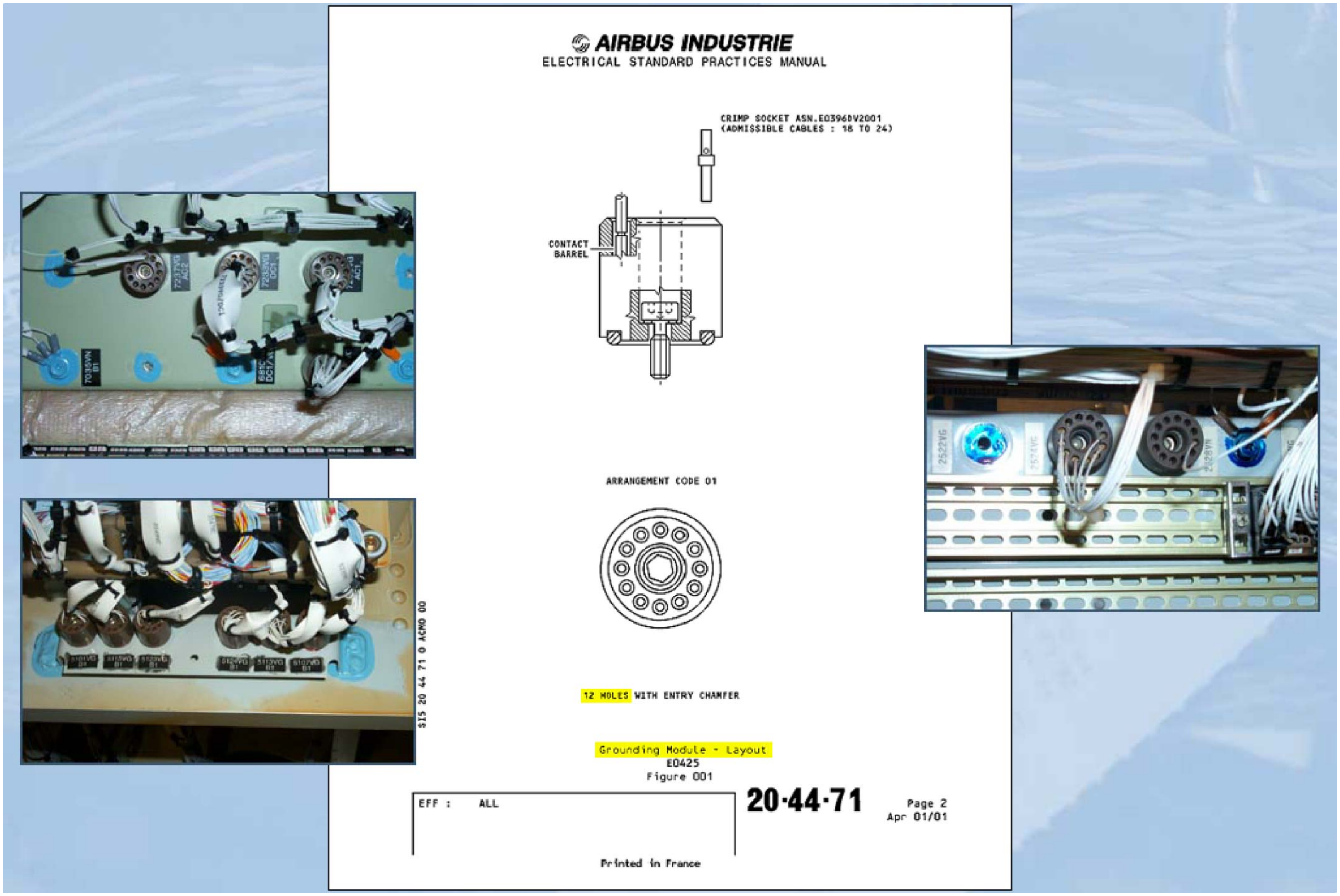
GROUNDING MODULES

X8U08481 - X0332T0 - XM2032000000001



GROUNDING MODULES

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

3. Connection procedure

A. Normal contacts

(1) E0425
Use contacts E0396 (Ref. 20-48-21)

(2) NSA937916
Use contacts NSA937910 (Ref.20-48-25)

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3. Connection procedure

A. Normal contacts

(1) E0425
Use contacts E0396 (Ref. 20-48-21)

(2) NSA937916
Use contacts NSA937910 (Ref.20-48-25)

GROUNDING MODULES

X8U08481 - X0332T0 - XM2032000000001

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

3. Connection procedure

A. Normal contacts

(1) E0425
Use contacts E0396 (Ref. 20-48-21)

(2) NSA937916
Use contacts NSA937910 (Ref.20-48-25)

E0396

3. Connection procedure

A. Normal contacts

(1) E0425
Use contacts E0396 (Ref. 20-48-21)

(2) NSA937916
Use contacts NSA937910 (Ref.20-48-25)

GROUNDING MODULES

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GENERAL TYPES AND IDENTIFICATION

PRESSURE SEALS

Grommet pressure seals and compound pressure seals.
Example of Part Number (PN) identification for grommet pressure seal:
- Pressure seal ABS0717

The cavity arrangement depends on the type code.
Procedure:
- Insert the wire.
- Draw the wire through the cavity.
- Install the accessories.

NSA934710 compound-filled pressure seal.
This pressure seal is delivered with:
- two half shells,
- a spring spacer.

Spring spacers.
- Cut the spring spacer.
- Put the spring spacer on the wire.

Note : For wires gauge 22 or 24, one spring spacer is necessary for a couple of wires. The same applies for a twisted wire. For other wires (gauge 20, 18, 16, etc...) it is necessary to use a spring spacer for each wire.
Ready to start the filling operation. Complete procedure available on the ESPM.

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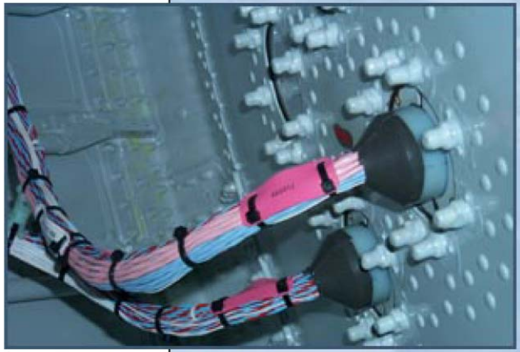
ELECTRICAL STANDARD PRACTICES MANUAL

PRESSURE SEALS - DESCRIPTION AND OPERATION

1. General
   This chapter concerns the description, installation and identification of pressure seals used on aircraft.

R A. Grommet type Pressure Seals (Ref. 20-43-41)
R Grommet type Pressure seals have the following codes
ABS0681
ABS0717
ABS0834
E0073
E0739
NSA934501
NSA934502
NSA934504

B. Compound Filled Pressure Seals (Ref. 20-43-42)
Compound filled pressure seals have the following codes
ABS0122
NSA934710



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PRESSURE SEALS

X8U08481 - X0332T0 - XM2032000000001

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ELECTRICAL STANDARD PRACTICES MANUAL

D.T.P. - TYPE PRESSURE SEALS - DESCRIPTION AND OPERATION

1. General

R The grommet type pressure seals installed on aircraft have the following
R codes:

ABS0717 Feed Through
ABS0834 Feed Through
E0073 Feed Through
ABS0681 Fireproof
E0739 Fireproof
NSA934501 Fireproof (2 passages)
NSA934502 Fireproof (13 passages)
NSA934504 Fireproof (4 passages)

2. Feed Through Pressure Seal

A. ABS0717

(1) P/N identificati
AB

(2) P/N characterist

(a) Temperature
Minimum oper
Maximum oper

(b) Cavity arrang... code
(Ref. Fig. 001)

(3) Installation procedure

(a) Preparation
- Attach the pressure seal to the structure, paying attention to the direction of installation of the grommet.
- Ensure that the O-ring is installed and make certain that this is positioned correctly in the groove.
- Tighten the nut of the grommet and secure with a lockwire.
- Slide the accessories (threaded ring, backshell with strain-relief etc.) onto the cable harness.
- Cut the wires at right-angles.

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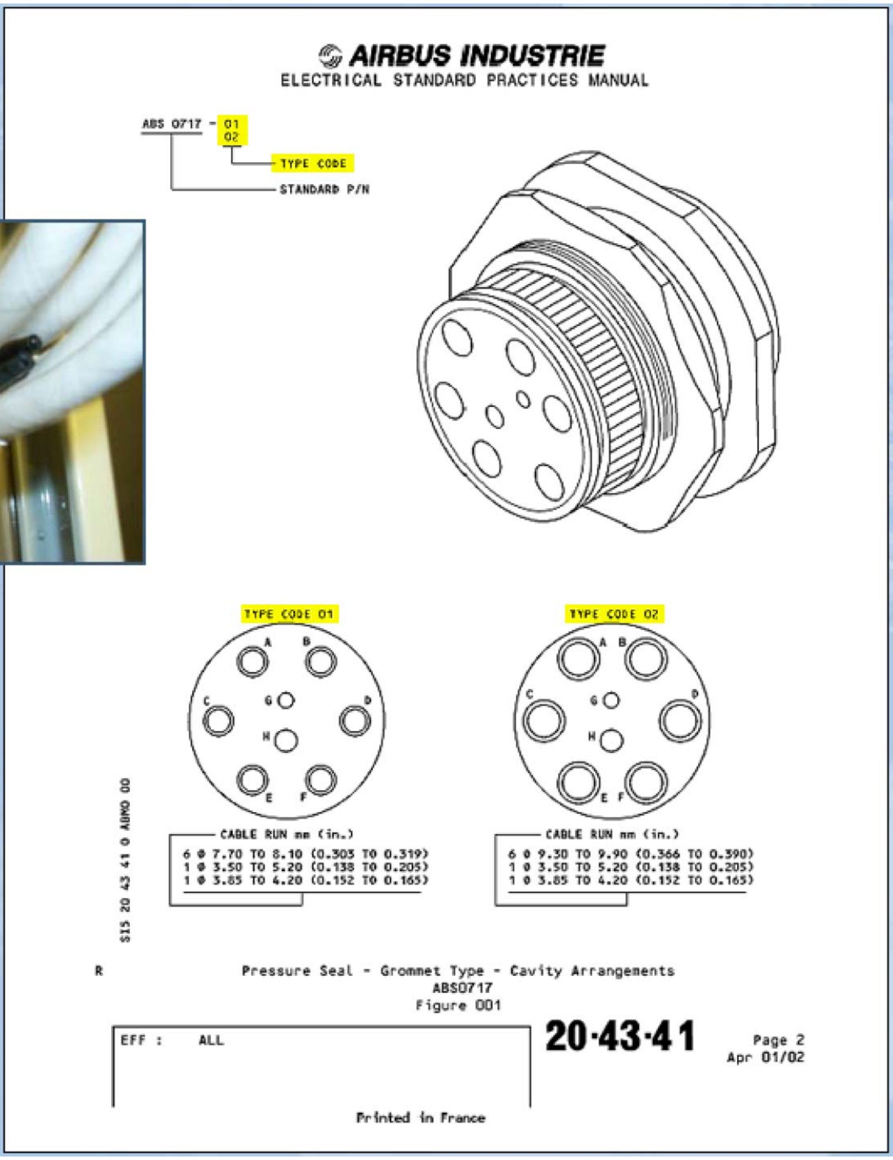
A. ABS0717

(1) P/N identification

```
ABS0717 - 01
   |      02
   |      |
   |      |_________________ Type code
   |__________________________ Standard P/N
```

PRESSURE SEALS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S15 20 43 41 0 ABNO 00

R

Pressure Seal - Grommet Type - Cavity Arrangements
ABS0717
Figure 001

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PRESSURE SEALS

X8U08481 - X0332T0 - XM2032000000001

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ELECTRICAL STANDARD PRACTICES MANUAL

NOTE : The wire cut must be clean without any protruding part or burns to avoid damage to the grommet of the pressure seal.

(b) Insertion of the electrical wires
- The tools and electrical wires must be clean and should be aligned with the axis of the hole during insertion to avoid dam

NOTE

B. ABS0834

(1) P/N ident

(2) P/N chara

(a) Temperature
Minimum operating temperature is : -55 deg.C (-67.00 deg.F).
Maximum operating temperature is : 200 deg.C (392.00 deg.F).

(b) Cavity arrangement code
(Ref. Fig. 002)

(3) Installation procedure

(a) Procedure
- Degrease and clean the surfaces using a lint face cloth and a small amount of cleaning agent(Material N°11-003).
- Wrap tape around the end of the cable.
- Insert the wire.
- Slowly draw the wire through the pressure seal until it reaches its final position.
- Secure the cable with the cable tie so that the cable will not move in the pressure seal.

EFF : ALL

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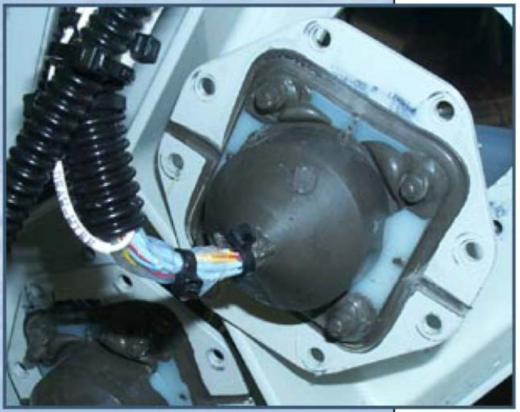
(b) Insertion of the electrical wires
- The tools and electrical wires must be clean and should be aligned with the axis of the hole during insertion to avoid damage to the grommet.

NOTE : Do not use lubricants for installation of the wires in the grommets.
- Insert the wires in the holes of the grommet.
- Slowly draw the wires through the pressure seal until it reaches its final position.
- The holes not used must be sealed with blind cables or sealing plugs.
- Install the accessories (threaded ring, backshell with strain-relief etc.) on the pressure seal.

PRESSURE SEALS



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ELECTRICAL STANDARD PRACTICES MANUAL

4. NSA934710

A. P/N Identification

```
                NSA934710   T   11
                    |       |    |
                    |       |    ------------- Type code
                    |       ------------------ Part code
                    -------------------------- Standard P/N
```

B. P/N Characteristics

(1) Temperature
Operating tempera

(2) Part code and typ
(Ref. Fig. 004)
T = Seal
E = Helical space

C. Installation Procedur

(1) Materials and too
- Adhesive tape (Not specific).
- SEALANTS (Material No. 09-002) or (Material No. 09-016).
- CLEANING AGENTS (Material No. 11-004A) or equivalent.
- Extrusion gun : SEMCO model 650 or PYLES model 950.
- Dia 4 mm (0.1574 in.) polyethylene nozzle.
- SEMCO cartridge.

(a) Preparation

CAUTION : THE MATERIAL BOND DEPENDS ON THE SURFACE CONDITION OF THE SUPPORT AND A STRONG BOND WILL MAKE SURE THAT THE SEALING IS CORRECT. CONSEQUENTLY,YOU MUST DO THIS OPERATION CAREFULLY.

- Find the point of passage on the cable bundle.
- Remove the cable ties at this point over a length sufficient for easy access to the cables in the middle of the bundle.
- Clean all the parts to be reactivated with a CLEANING AGENTS (Material No. 11-004A) or equivalent.
- The surfaces must be fully dry before you apply the SEALANTS (Material No. 09-002) or (Material No. 09-016).

(2) Sealing procedure
(Ref. Fig. 005)

4. NSA934710

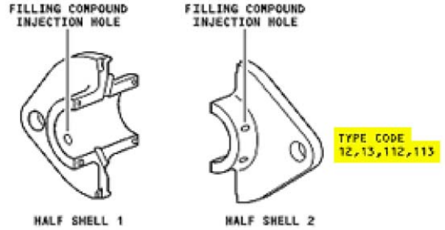
A. P/N Identification

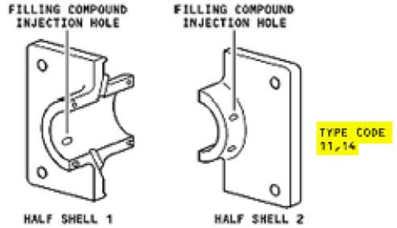
```
                NSA934710   T   11
                    |       |    |
                    |       |    ------------- Type code
                    |       ------------------ Part code
                    -------------------------- Standard P/N
```

PRESSURE SEALS

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

PART CODE T:





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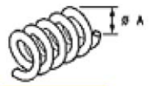

SPRING SPACER

TYPE CODE	ØA(mm)	DELIVERY LENGTH
20	1.52	304.8mm
23	3.05	
24	6.35	

Pressure Seal (Compound Filled) - Characteristics
NSA934710
Figure 004

EFF : ALL

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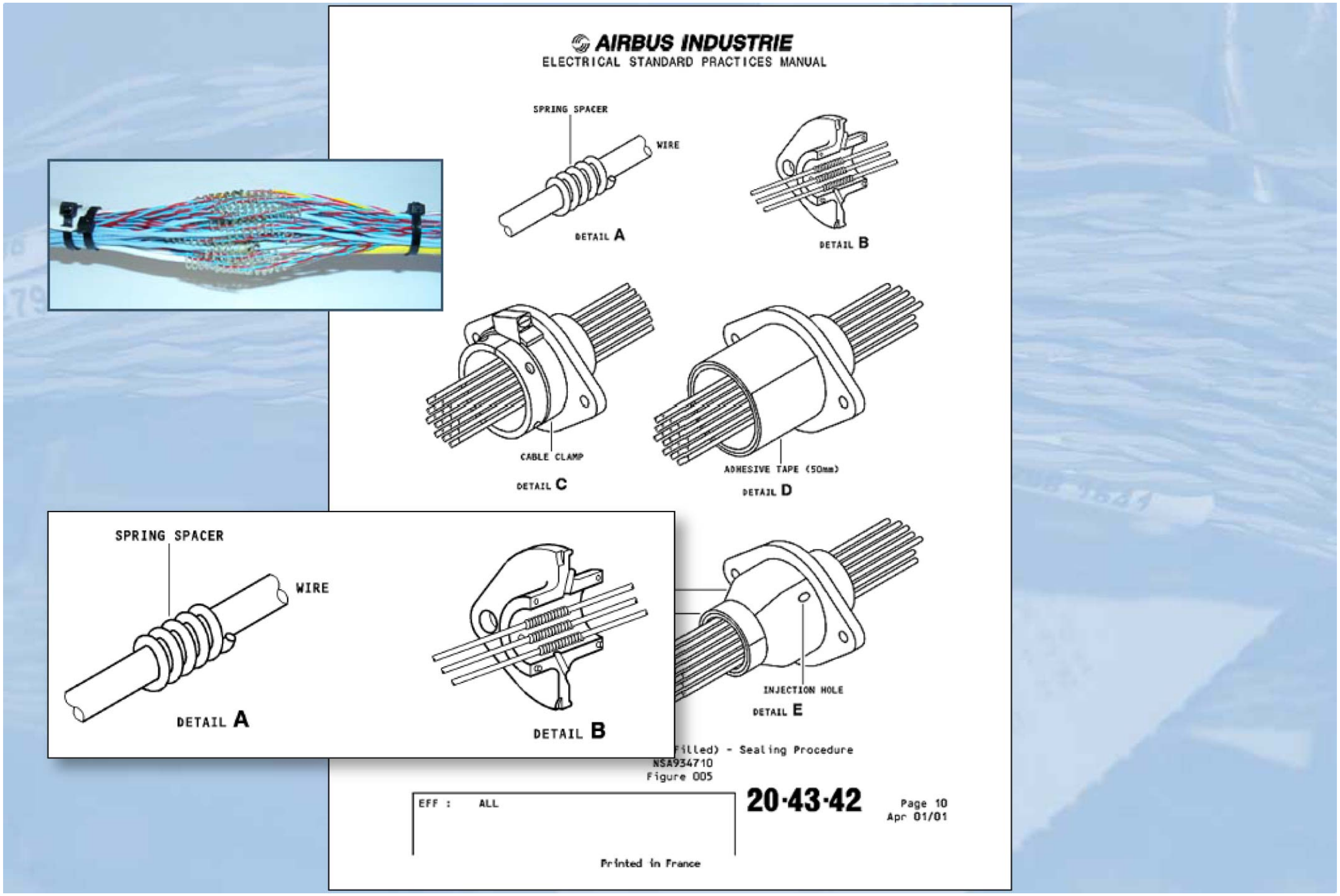
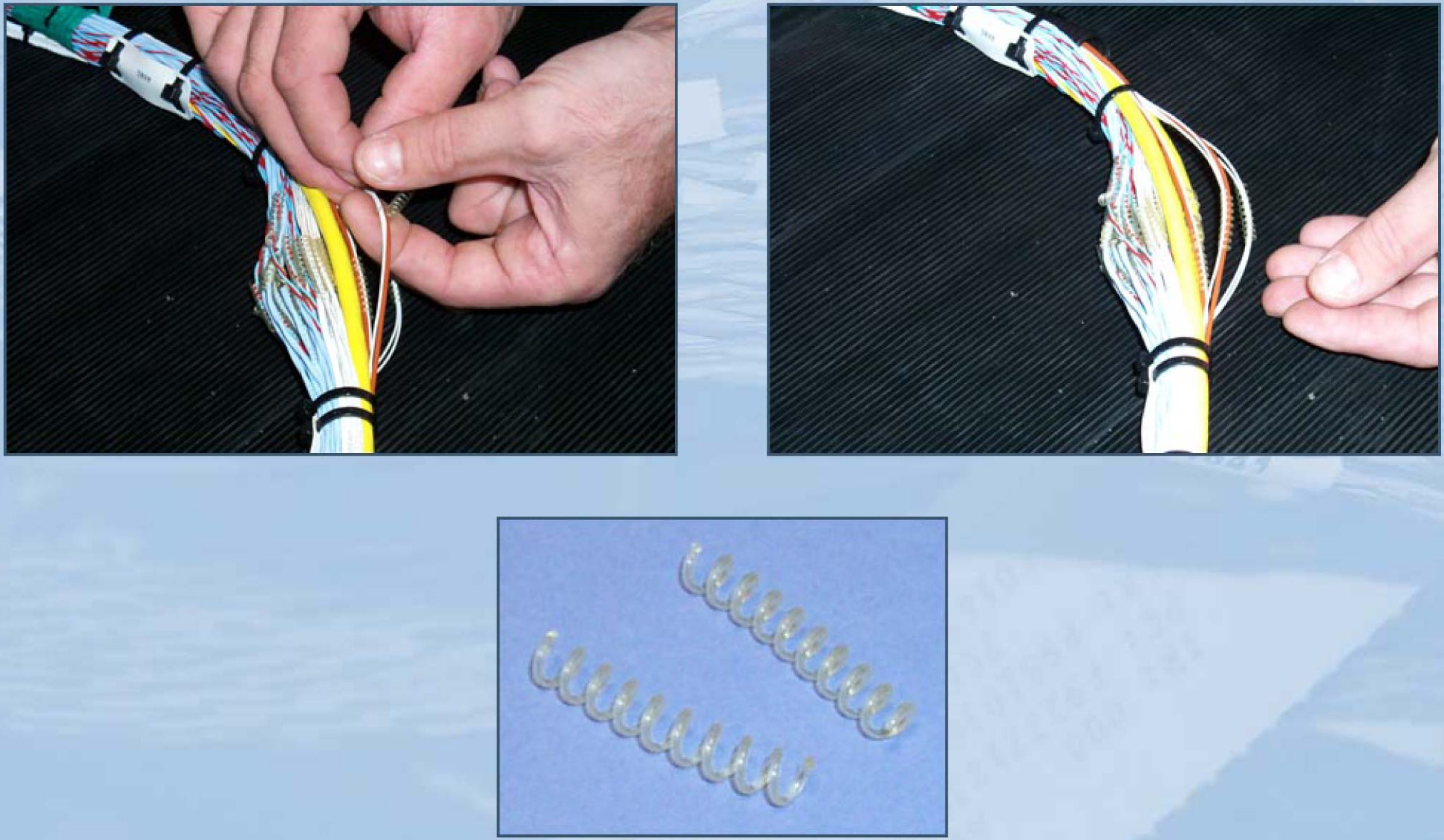
PRESSURE SEALS

X8U08481 - X0332T0 - XM2032000000001

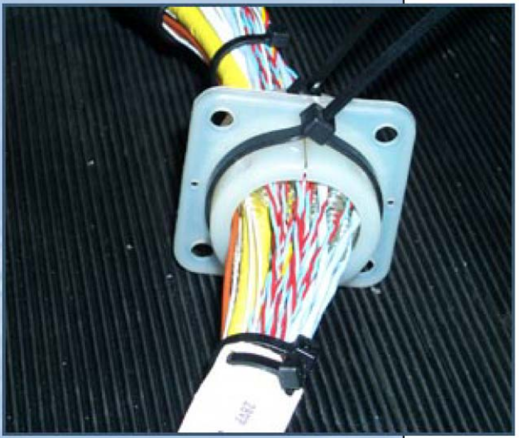


PRESSURE SEALS

X8U08481 - X0332T0 - XM20320000000001



PRESSURE SEALS

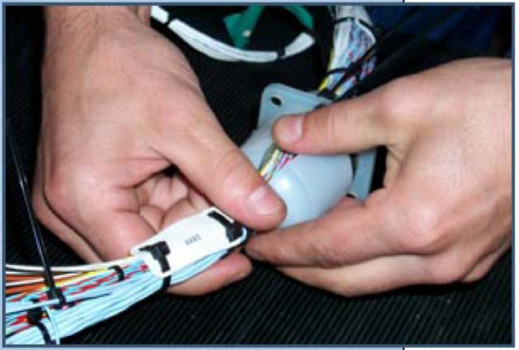


AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

WARNING : DO NOT GET THE COMPOUND ON YOUR SKIN.
IF YOU DO :
- REMOVE IT IMMEDIATELY WITH A CLEAN CLOTH,
- WASH YOUR SKIN WITH SOAP AND RINSE WITH CLEAN WATER
DO NOT GET FLUID ON YOUR SKIN OR IN YOUR EYES.
IF YOU DO :
- FLUSH IT AWAY WITH CLEAN WATER.
- GET MEDICAL AID.

- Cut the spring spacers to a length slightly shorter than that of the seal fitting.
- Put the spring spacers on each wire gauge 20 and under, on two wires gauge 22 and 24 or on each twisted bundle (Ref, detail A).
- Put the spacers in position in the seal fitting (Ref. detail B).
- Put the gun nozzle between each wires and move it while you extrude the compound in order to coat all the wires with the SEALANTS (Material No. 09-002) or (Material No. 09-016).
- Make sure that the nozzle is at the surface of the product level to prevent the formation of air bubbles. The necessary pressure is approximately 3 bar (43.5113 psi).
- Install the half shells (1 and 2) of the seal when the assembly is correctly filled.
- Use a cable clamp and tighten it slowly until the half-shells are put together, then discard the clamp (Ref. detail C).
- Wind protective adhesive tape (50 mm (1.9685 in.) width) three times around the end of the seal fitting (Ref. detail D).
- Close with adhesive tape and crepe paper (19 mm (0.7480 in.) width) (Ref. detail E).
- Repeat at the other end of the seal.
- Make a hole in the tape at level of one of the injection holes of the seal fitting (Ref. detail E).
- Fill the flange with SEALANTS (Material No. 09-002) or (Material No. 09-016) and attach the seal fitting.
- Inject the SEALANTS (Material No. 09-002) or (Material No. 09-016) through the first hole until it shows between the gaps or on the wires.
- Close the hole with adhesive tape.
- Make another hole and do again the filling operation.
- Do the same with all the holes of the seal fitting.
- After the curing time has elapsed, remove the tapes and clean off surplus sealant with CLEANING AGENTS (Material No. 11-004A) or equivalent.



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PRESSURE SEALS

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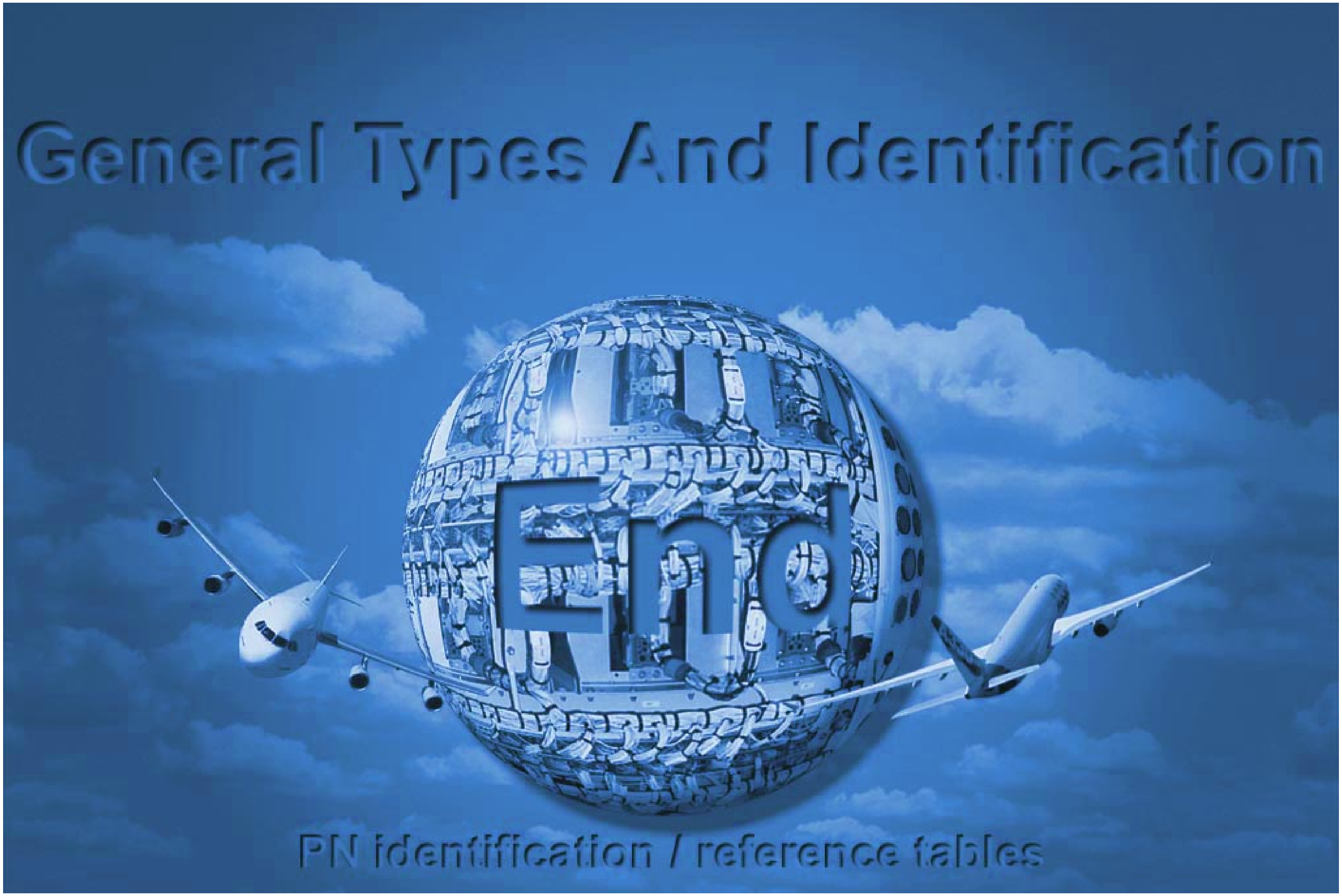

PRESSURE SEALS

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CAUTIONS AND PROTECTIONS

STACKING OF TERMINALS

Before installing terminals on aircraft you must be aware of some rules:
- use washers if necessary.
- be aware of the metal type compatibility of the terminals.

This is to prevent damage and chemical reactions.
Nut / Washer / Terminal lug installation.
Two lugs associated:
Check the order of installation of the lugs.
Three lugs associated.
Four lugs associated.
For the grounding points:
- Install the largest lug first.
- Install the three others in an order of decreasing size.
- Fan the lugs and apply the protection varnish.

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

STACKING OF TERMINALS - DESCRIPTION AND OPERATION

1. General Rules

A. Installation of Terminal Lug
(Ref. Fig. 001)
Use a washer in the cases below:

(1) If the diameter of the stud is less than 9.5 mm (0.37 in.):
- Add a flat washer.

(2) If the diameter of the nut is less than 50% of the terminal surfa
- Add a flat washer made of corrosion-resistant silver steel

(3) If the diameter of the stud is more than 9.5 mm (0.37 in.):
- Add a copper lug spring washer (ONDUFLEX type) or lock washer (GROWER type), with a flat washer made of corrosion-resistant silver steel (not mandatory).

(4) For an aluminum lug and for all the stud diameters, use a spring washer (ONDUFLEX type).

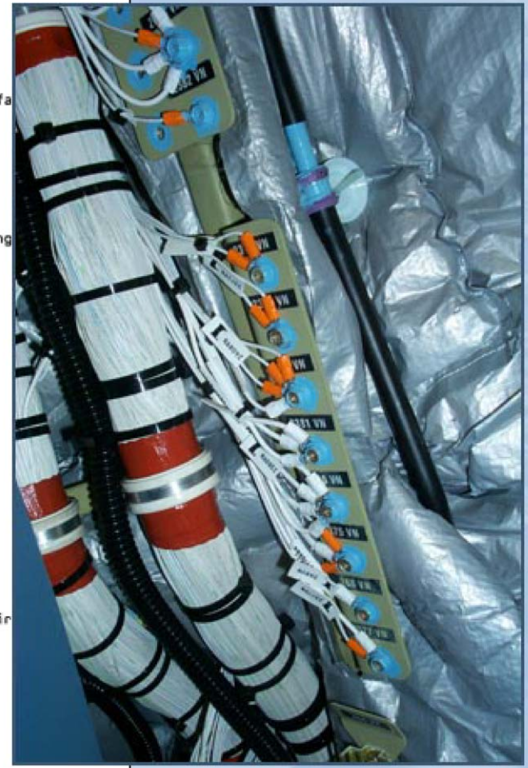
B. Stacking of two Terminal Lugs (Cu/Al)
(Ref. Fig. 001)
- Install the aluminum lug.
- Install the copper lug.
- Install a spring or a lock washer.

C. Stacking of three Terminal Lugs
(Ref. Fig. 002)
Install the lugs according to their metal type.
Example: - Install Aluminum lug
- Install copper lug

D. Stacking of four Terminal Lugs
(Ref. Fig. 002)
Install the lugs in pairs as follows:

(1) For the terminal blocks (VT):

(a) Single-pole:
- Put the lugs back to back to make a pair and stack the pair
opposite direction.
(Ref. Fig. 002)



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STACKING OF TERMINALS

X8U08481 - X0332T0 - XM203300000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-51-40 - Stacking of Terminals - Two- and Three-Terminal Installation	

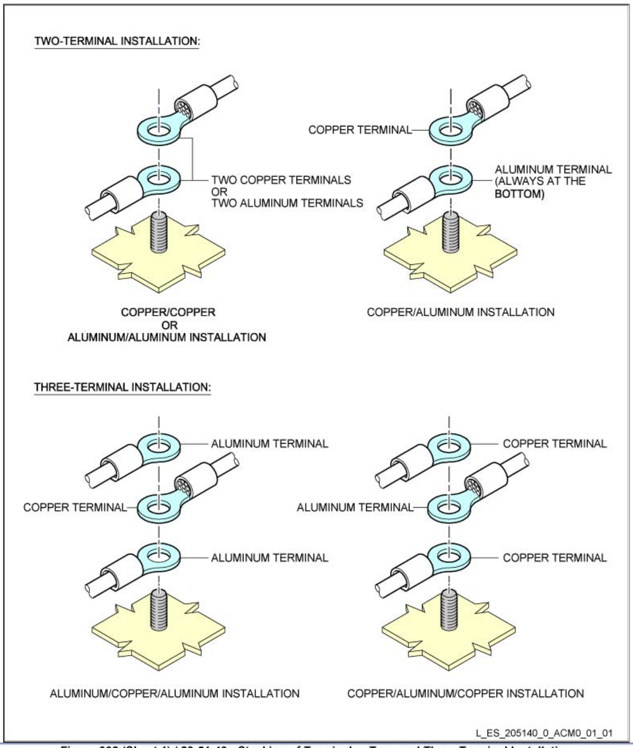

Figure 002 (Sheet 1) / 20-51-40 - Stacking of Terminals - Two- and Three-Terminal Installation

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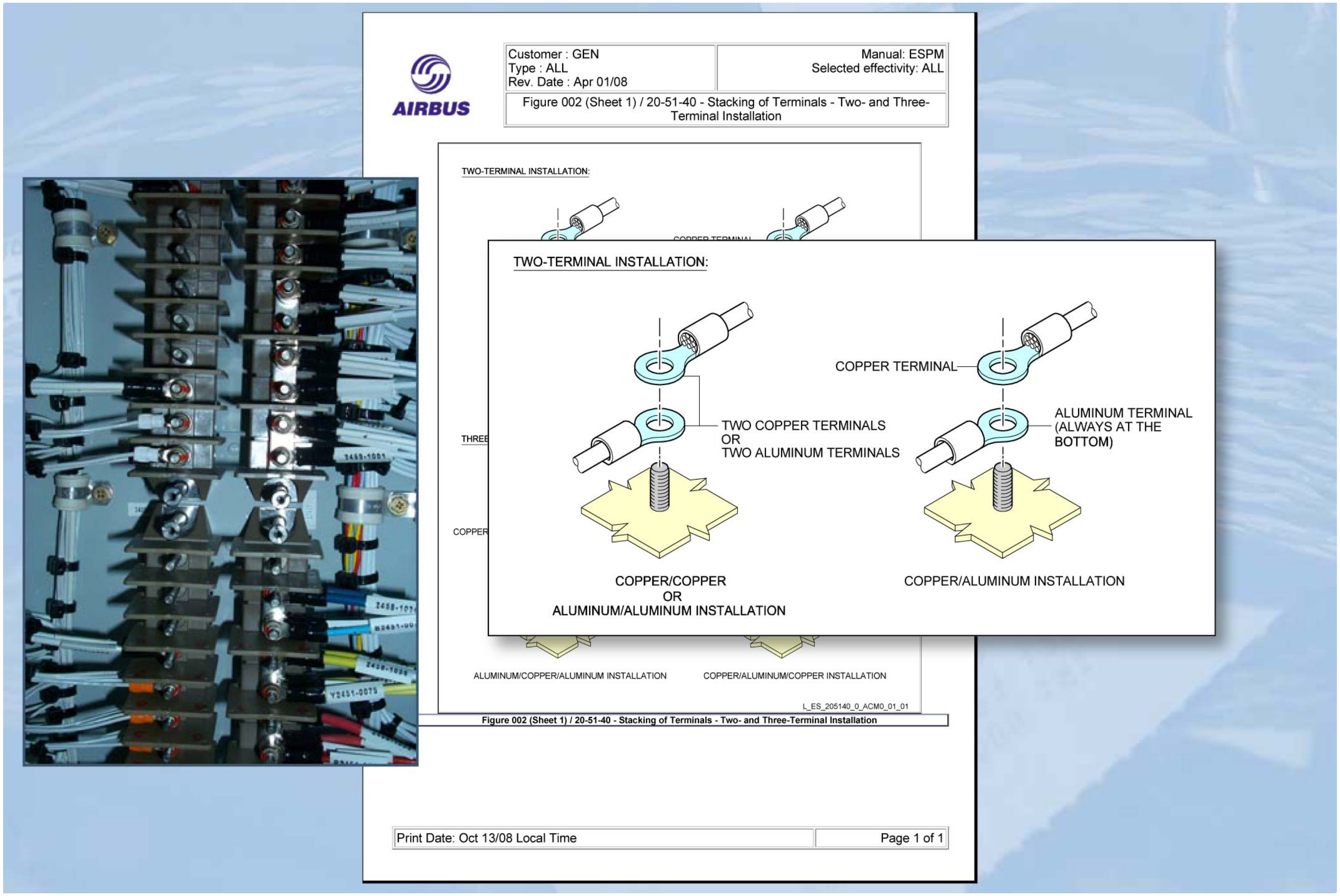
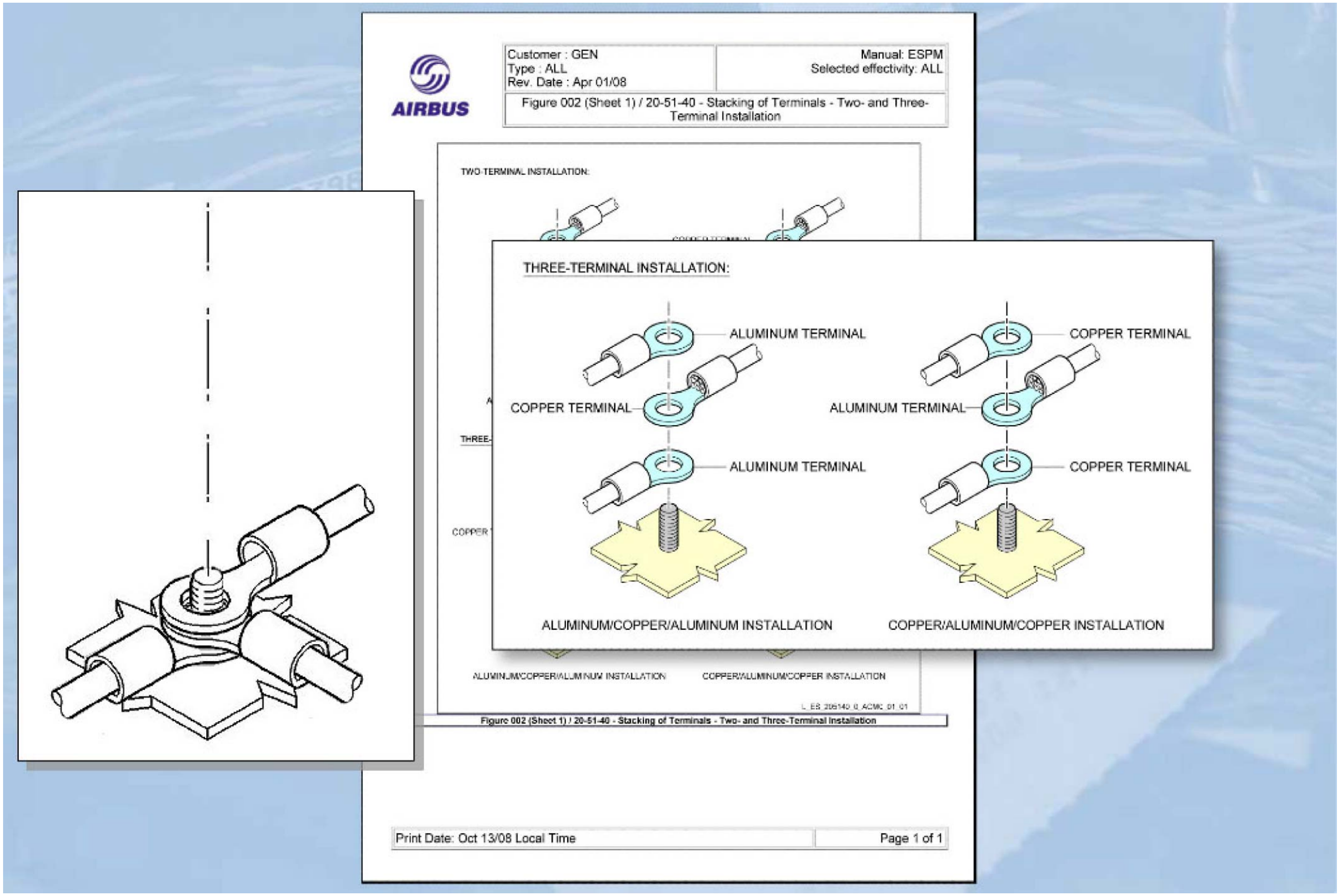
STACKING OF TERMINALS

X8U08481 - X0332T0 - XM2033000000001



STACKING OF TERMINALS

X8U08481 - X0332T0 - XM20330000000001



STACKING OF TERMINALS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 003 (Sheet 1) / 20-51-40 - Stacking of Terminals - Four-Terminal Installation	

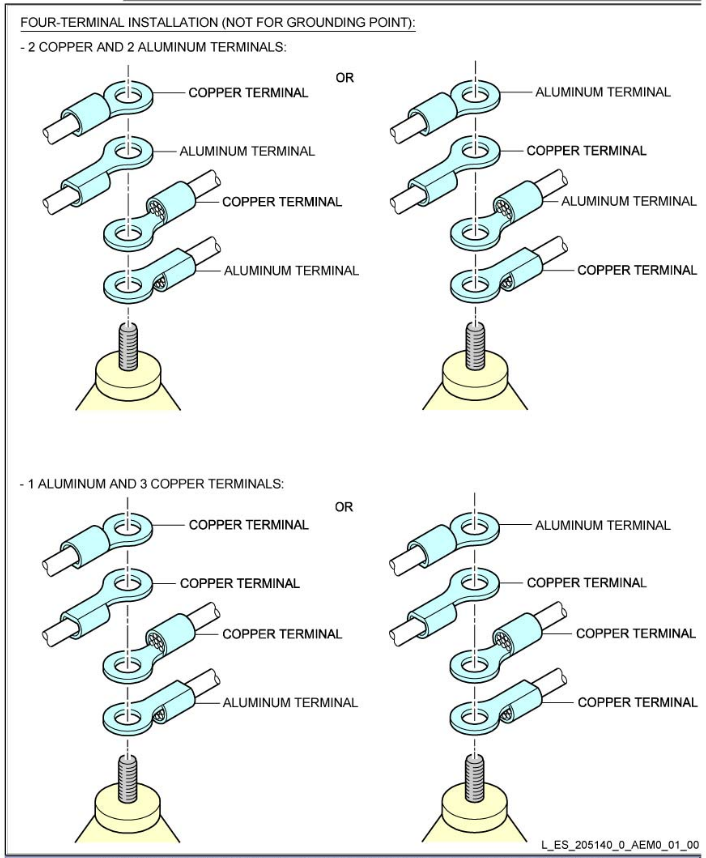


Figure 003 (Sheet 1) / 20-51-40 - Stacking of Terminals - Four-Terminal Installation

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 005 (Sheet 1) / 20-51-40 - Stacking of Terminals - Terminal/Washers/Nut Installation Order	

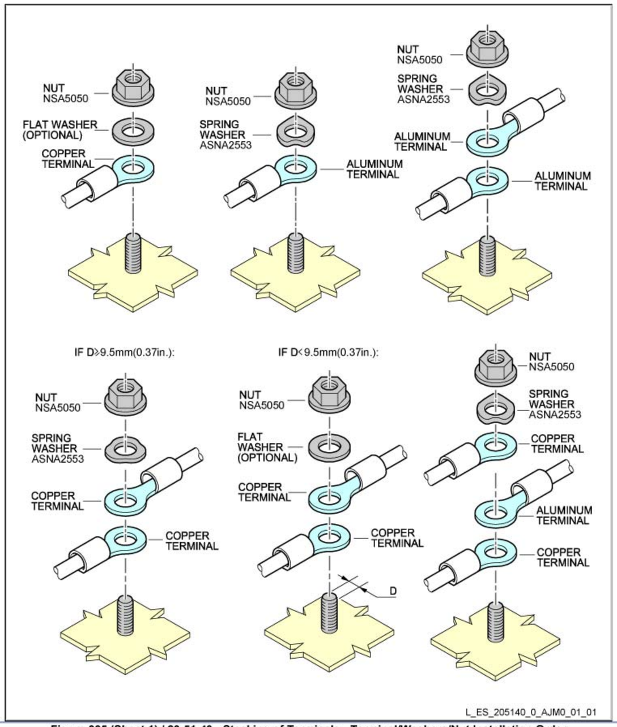

Figure 005 (Sheet 1) / 20-51-40 - Stacking of Terminals - Terminal/Washers/Nut Installation Order

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STACKING OF TERMINALS

X8U08481 - X0332T0 - XM2033000000001

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 004 (Sheet 1) / 20-51-40 - Stacking of Terminals - Four-Terminal Installation and Bending	

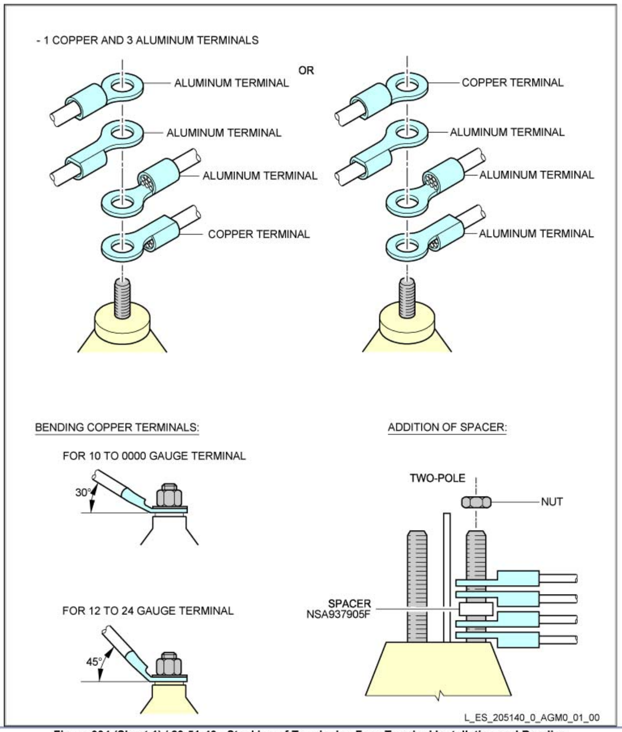

Figure 004 (Sheet 1) / 20-51-40 - Stacking of Terminals - Four-Terminal Installation and Bending

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-51-40 - Stacking of Terminals - Terminal Orientation	

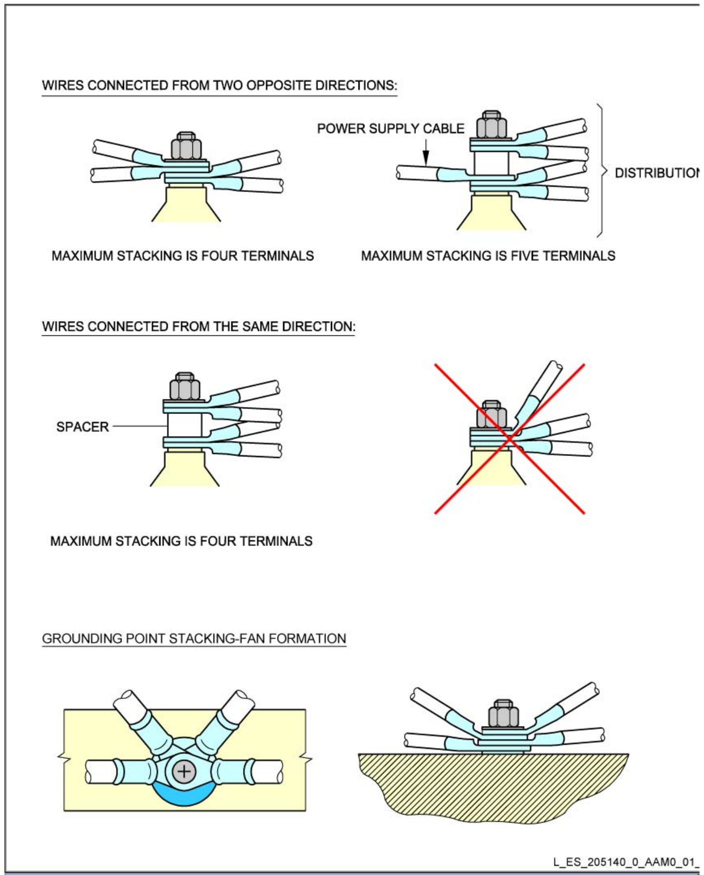

Figure 001 (Sheet 1) / 20-51-40 - Stacking of Terminals - Terminal Orientation

Print Date: Oct 13/08 Local Time	Page 1 of 1

STACKING OF TERMINALS

X8U08481 - X0332T0 - XM2033000000001

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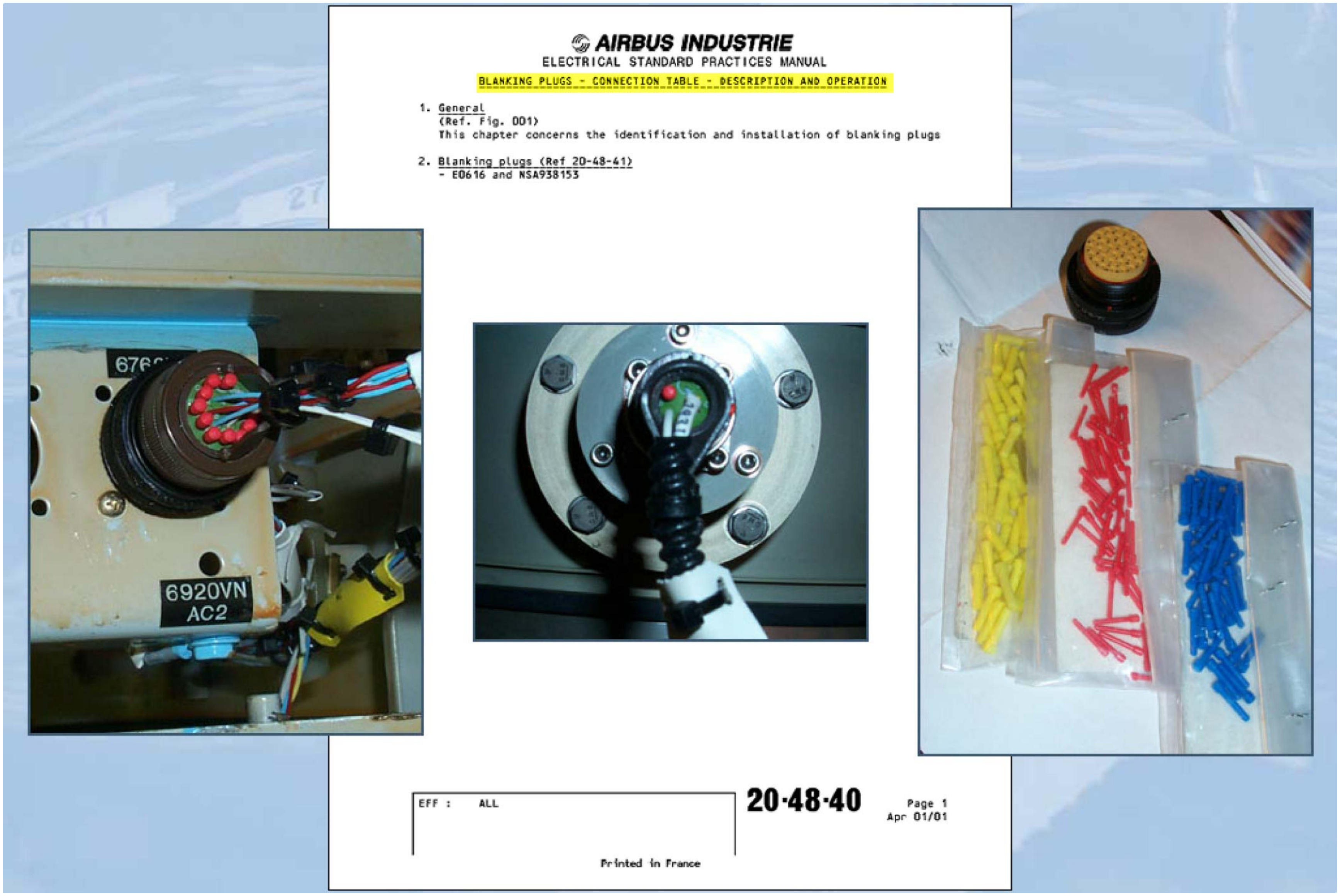
CAUTIONS AND PROTECTIONS

BLANKING PLUGS

This part concerns the installation of blanking plugs on the connectors.
In all the unused grommet connector cavities, the blanking plugs are installed in order to prevent dust contamination, and more particularly in non-pressurized areas because of the risk of fluid contamination.
In other words the blanking plugs permit a connector with free cavities to still be sealed.
Different sizes are available depending on the cavity admissible wire size.
For example in this table you can see that for a Gauge 22 cavity you must use an E0616BB2200 blanking plug.
The usual installation of a blanking plug is with the gap outside of the grommet, but for the E0734 plug specification, you must insert the cap first.



BLANKING PLUGS

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-48-40 - Blanking Plugs - Connection Table

BLANKING PLUGS	USE WITH			ATA REF
	PLUG	RECEPTACLE	MODULE	
E0616 NSA938153	ABS0084-ABS0364** ABS0375**-ABS0497 ABS0713**-ABS0773 ABS0831-ABS1054* ABS1340*-ABS1343* E0007-E0039-E0052* E0076-E0077-E0083 E0086-E0087-E0094 E0095-E0097-E0122 E0145-E0150-E0161 E0163*-E0165*-E0186 E0195-E0233-E0237** E0320-E0362**-E0390** E0441-E0442-E0451 E0452-E0579-E0684* E0713*-E0726-E0756 E0773-EN2997*-EN3545* EN3646* NSA938000-NSA938026 NSA938027-NSA938050 NSA938051-NSA938070 NSA938151-NSA938310 NSA938323-NSA938325 NSA938331-NSA938332 NSA938341-NSA938346 NSA938361-NSA938922B NSA938325-NSA938932	ABS0498 ABS1054* ABS1426 ABS1427 E0040 E0041 E0053* E0054 E0079 E0087 E0093 E0095 E0097 E0110 E0111 E0147 E0187 E0197 E0321 E0322 E0362** E0444 E0454 E0734* NSA938001 NSA938002 NSA938028 NSA938323 NSA938325 NSA938341 NSA938346 NSA938361 NSA938901 NSA938922A NSA938925 NSA938931	NSA937901M/MB*	20-48-41
MS27488-20-1	-	-	ABS1438	

NOTE: HAZARDOUS AREAS SUCH AS:
- CARGO COMPARTMENT UNDERFLOOR ZONES
- DOOR AND UNDERSILL ZONES
- TWO FRAMES LEFT AND RIGHT SIDE OF CARGO DOOR
- **CONNECTORS INSTALLED VERTICALLY**
- INSTALLATION IN CEILING
- CONNECTORS INSTALLED BETWEEN THE STRUCTURE AND THE INSULATING BLANKETS
- SIDE STICK CONTROLLER VUs AND THEIR INTERFACES
- UNDER COCKPIT SLIDING WINDOWS
- UNDER JUNCTION PANEL FLOOR
- WATER INGRESS RISKS (E. G. GALLEY, TOILET)

* INSTALL BLANKING PLUG IN NON-PRESSURIZED AREAS **AND HAZARDOUS PRESSURIZED AREAS.**

** INSTALL BLANKING PLUG ONLY IN HAZARDOUS PRESSURIZED AREAS.

WITHOUT "*" INSTALL BLANKING PLUG ONLY IN NON-PRESSURIZED AREAS.

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Figure 001 (Sheet 1) / 20-48-40 - Blanking Plugs - Connection Table

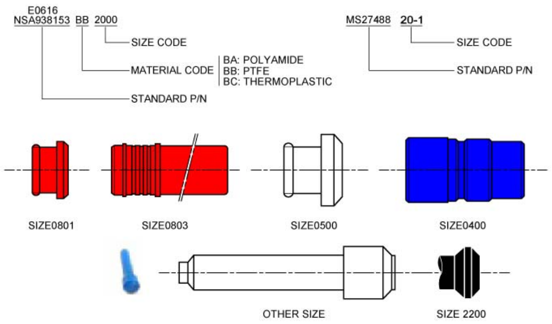
Print Date: Oct 13/08 Local Time	Page 1 of 1

BLANKING PLUGS

X8U08481 - X0332T0 - XM2033000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-48-41 - Blanking Plugs - P/N Characteristics E0616, MS27488 and NSA938153



E0616	NSA938153	MS27488	COLOR	CAVITY SIZE
BB2200	-	22-1	BLACK	22/23
BA2000	BA2000	20-1	RED	20
BB2000	BB2000			
BA1600	BA1600	16-1	BLUE	16
BB1600	BB1600			
BA1200	BA1200	12-1	YELLOW	12
BB1200	BB1200			
BA0800	BA0800	8.1	RED	8
BB0800	BB0800			
BC0801	-		RED	8
BC0803				
BB0500	-	-	WHITE	5
BA0500				
BA0400	-	4-1	BLUE	4
BB0400				
BC0400				
-	-	0-1	YELLOW	0

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Figure 001 (Sheet 1) / 20-48-41 - Blanking Plugs - P/N Characteristics E0616, MS27488 and NSA938153

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BLANKING PLUGS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-48-41 - Blanking Plugs - Installation E0616, MS27488 and NSA938153	

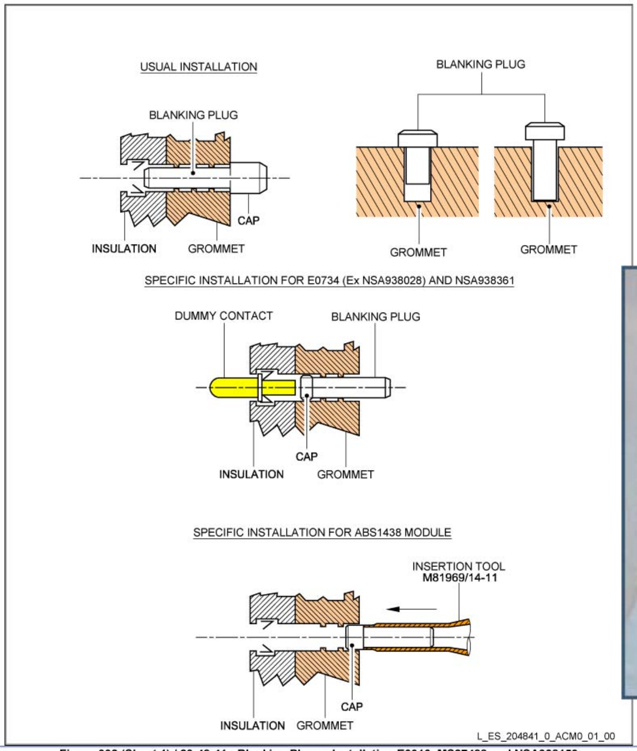

Figure 002 (Sheet 1) / 20-48-41 - Blanking Plugs - Installation E0616, MS27488 and NSA938153

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BLANKING PLUGS

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CAUTIONS AND PROTECTIONS

PROTECTION WITH CAPS

Different protections must be installed on connectors (Plug and Receptacle) during maintenance operations and in case of equipment disconnection.
Protection with caps:
Protection with caps is used for damage or contamination prevention on contacts.
There are caps for circular connectors.
For ARINC connectors.
And for other types of rectangular connector.
Never use adhesive tape to protect the stored connectors. The adhesive product could damage the contacts of the connectors.

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PROTECTION DURING MAINTENANCE CHECKS - DESCRIPTION AND OPERATION

1. General
   This chapter gives the protections used on aircraft.

2. Structure of the chapter.

   A. Protection by Caps (Ref. 20-54-10).

   B. Protection by Sleeves (Ref. 20-54-20).

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PROTECTION WITH CAPS

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ELECTRICAL STANDARD PRACTICES MANUAL

PROTECTION BY CAPS - DESCRIPTION AND OPERATION

1. General
   This chapter gives the different protections that must be installed on connectors (plug and receptacle) during maintenance checks, and in case of equipment disconnection.

2. Protective Caps
   Protective caps are used to prevent contamination or damage to the contacts.

   A. Caps for NAS1599 type connectors.
      (Ref. Fig. 001)

   B. Caps for ARINC type connectors.
      (Ref. Fig. 002)

   C. Caps for rectangular type connectors.
      (Ref. Fig. 003)

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Apr 01/01

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PROTECTION WITH CAPS

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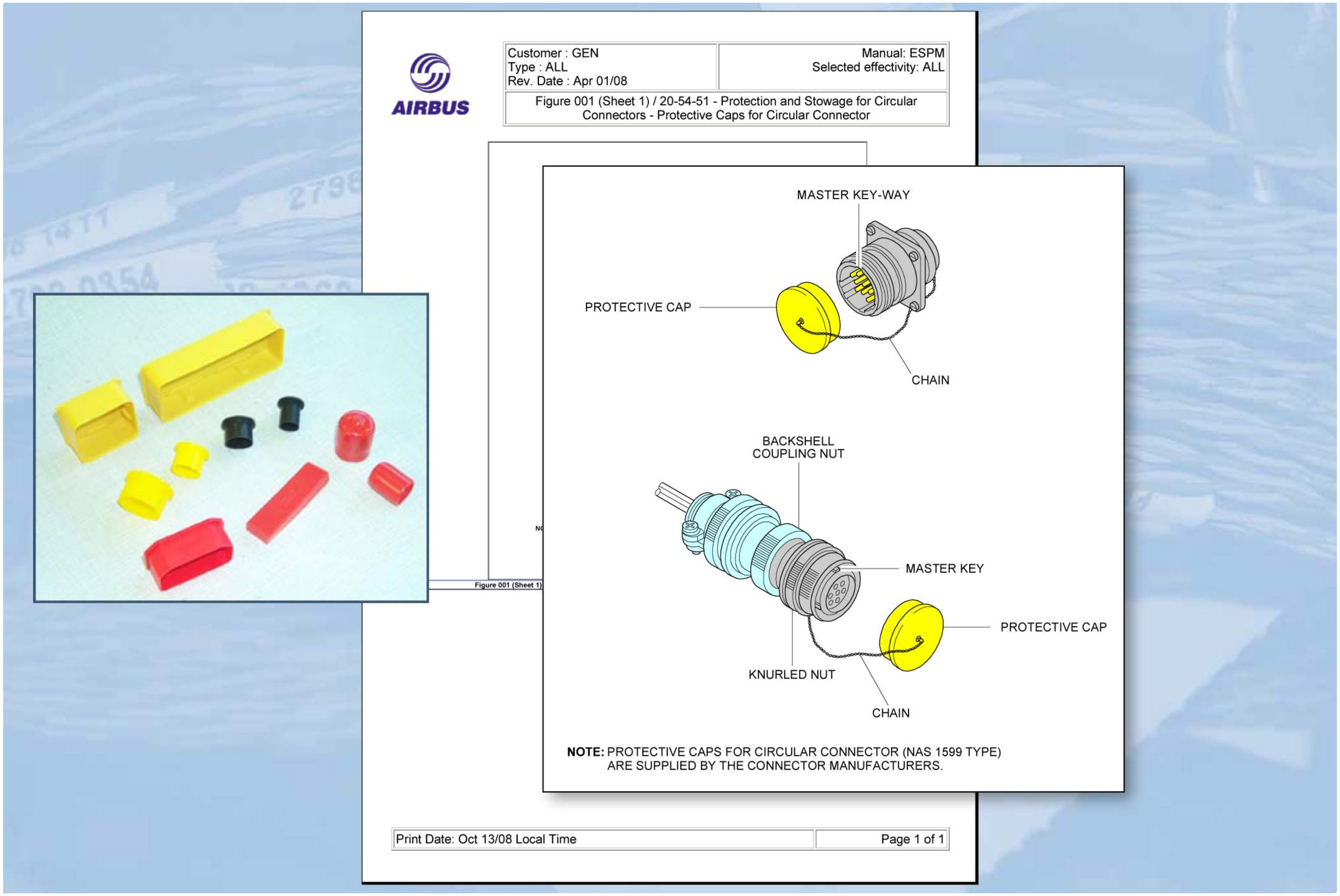

PROTECTION WITH CAPS

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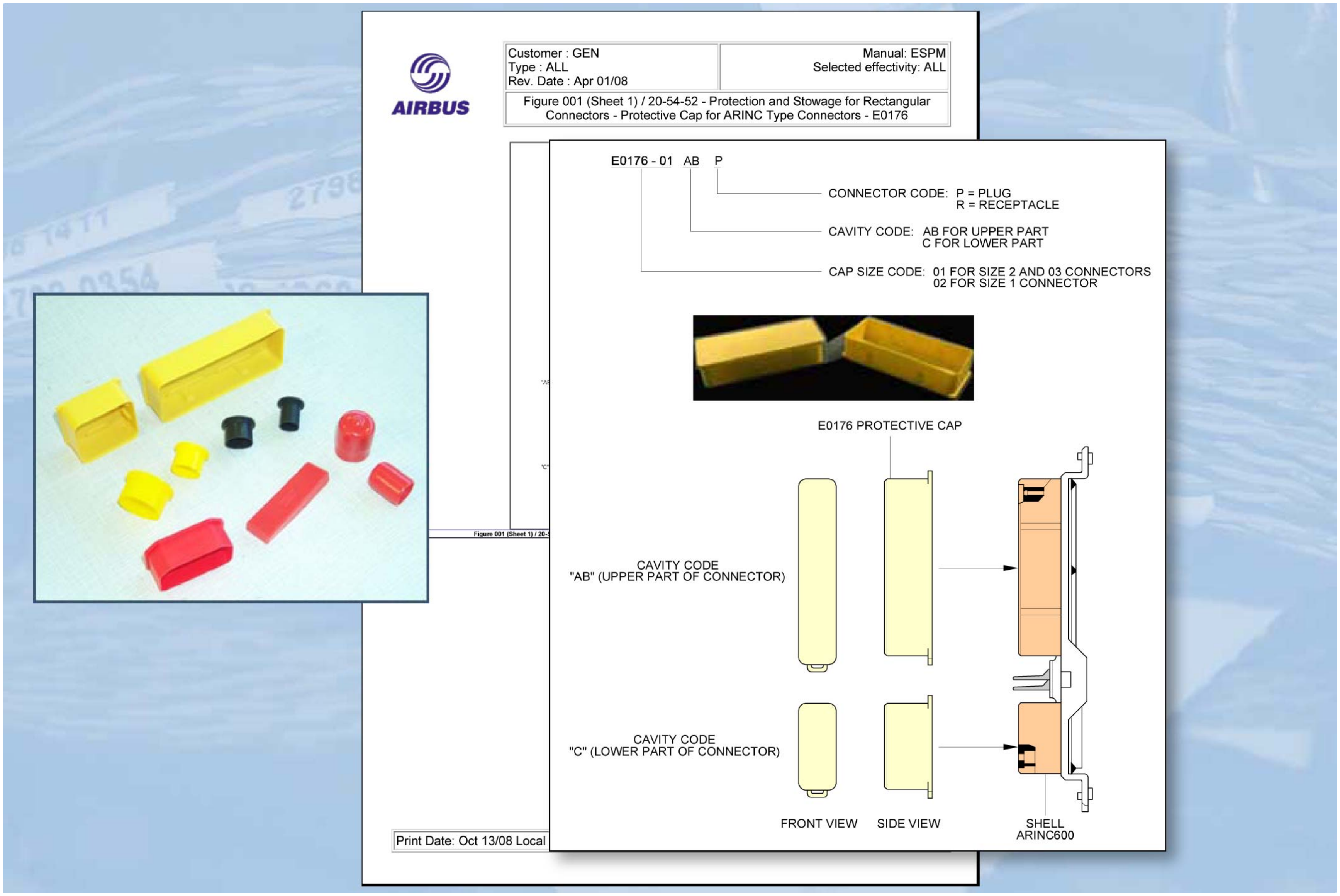

PROTECTION WITH CAPS

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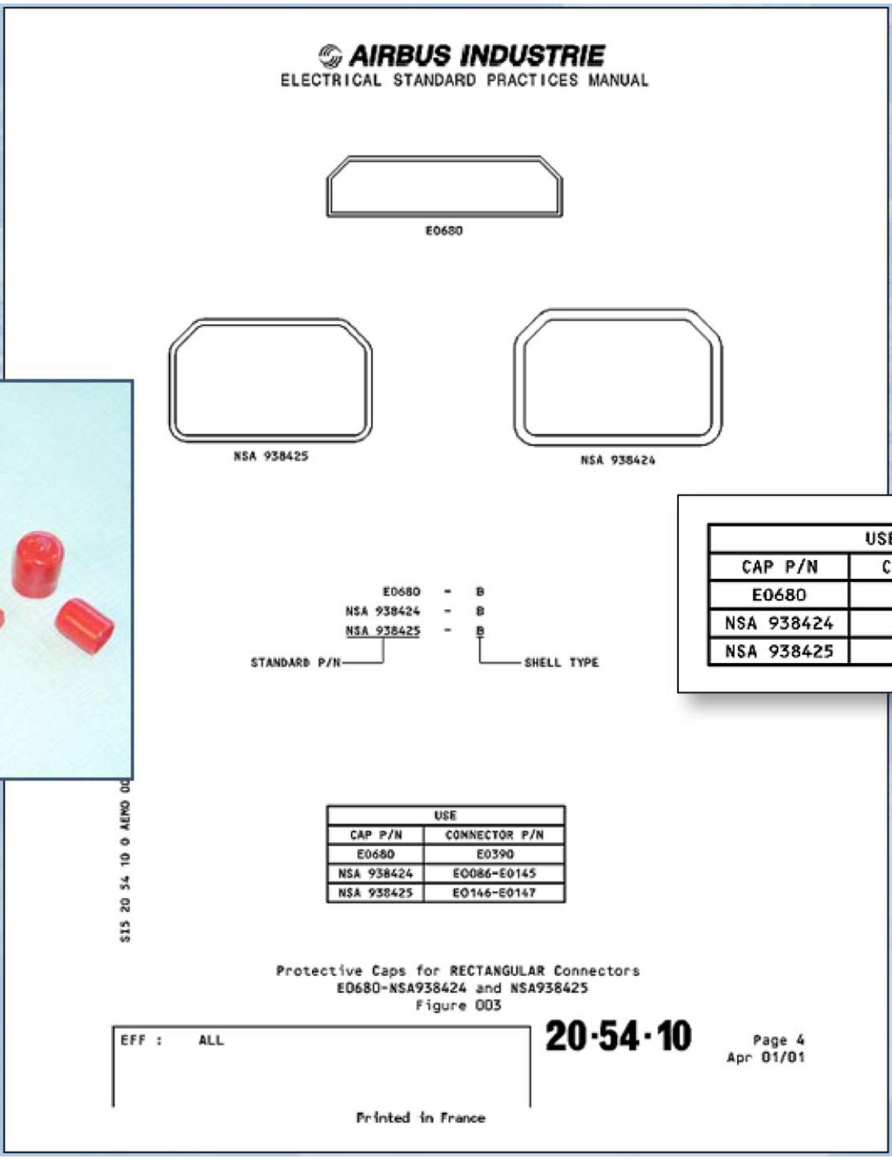

USE	
CAP P/N	CONNECTOR P/N
E0680	E0390
NSA 938424	E0086-E0145
NSA 938425	E0146-E0147

Protective Caps for RECTANGULAR Connectors
E0680-NSA938424 and NSA938425
Figure 003

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USE	
CAP P/N	CONNECTOR P/N
E0680	E0390
NSA 938424	E0086-E0145
NSA 938425	E0146-E0147

PROTECTION WITH CAPS

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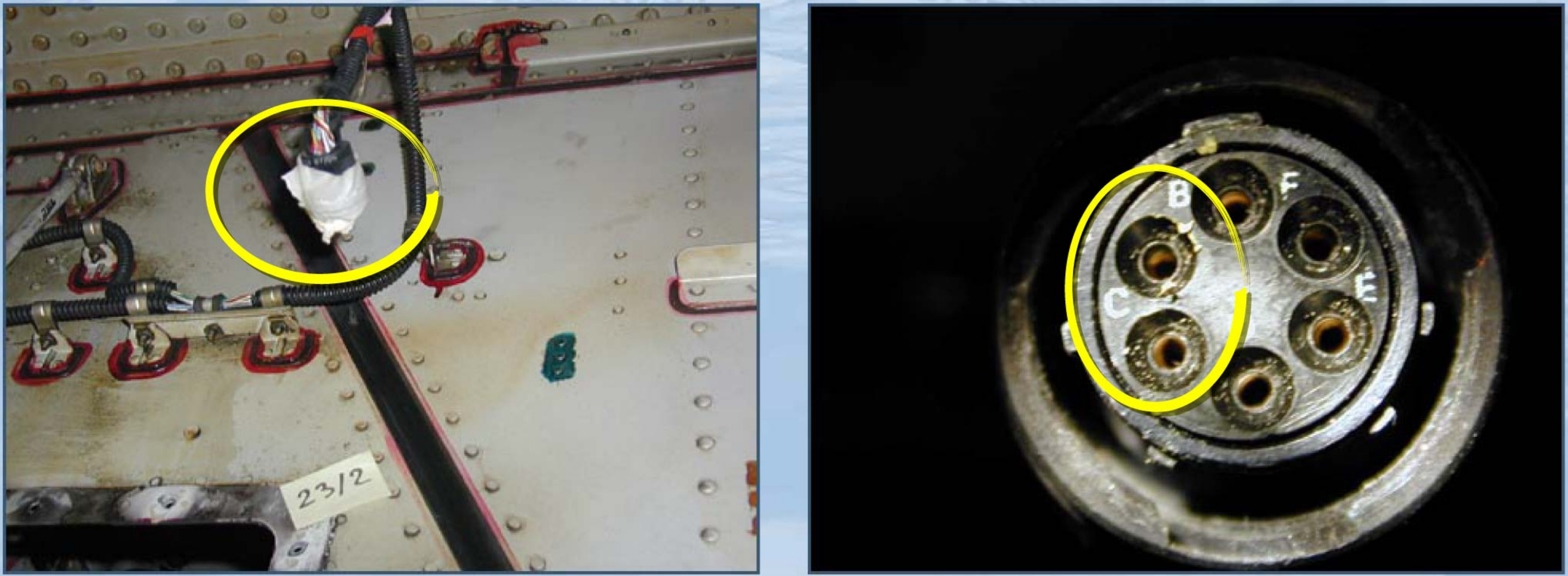

PROTECTION WITH CAPS

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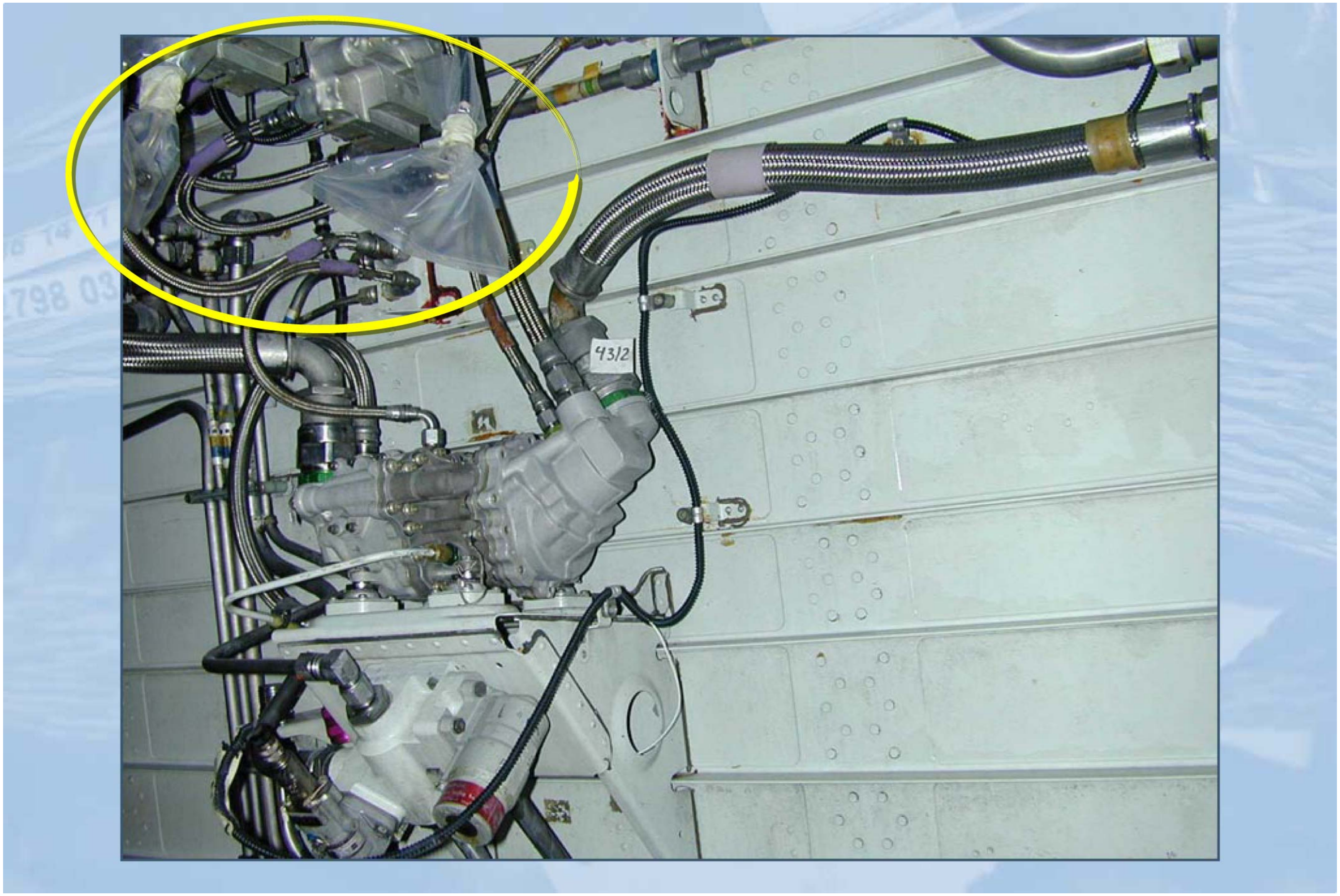
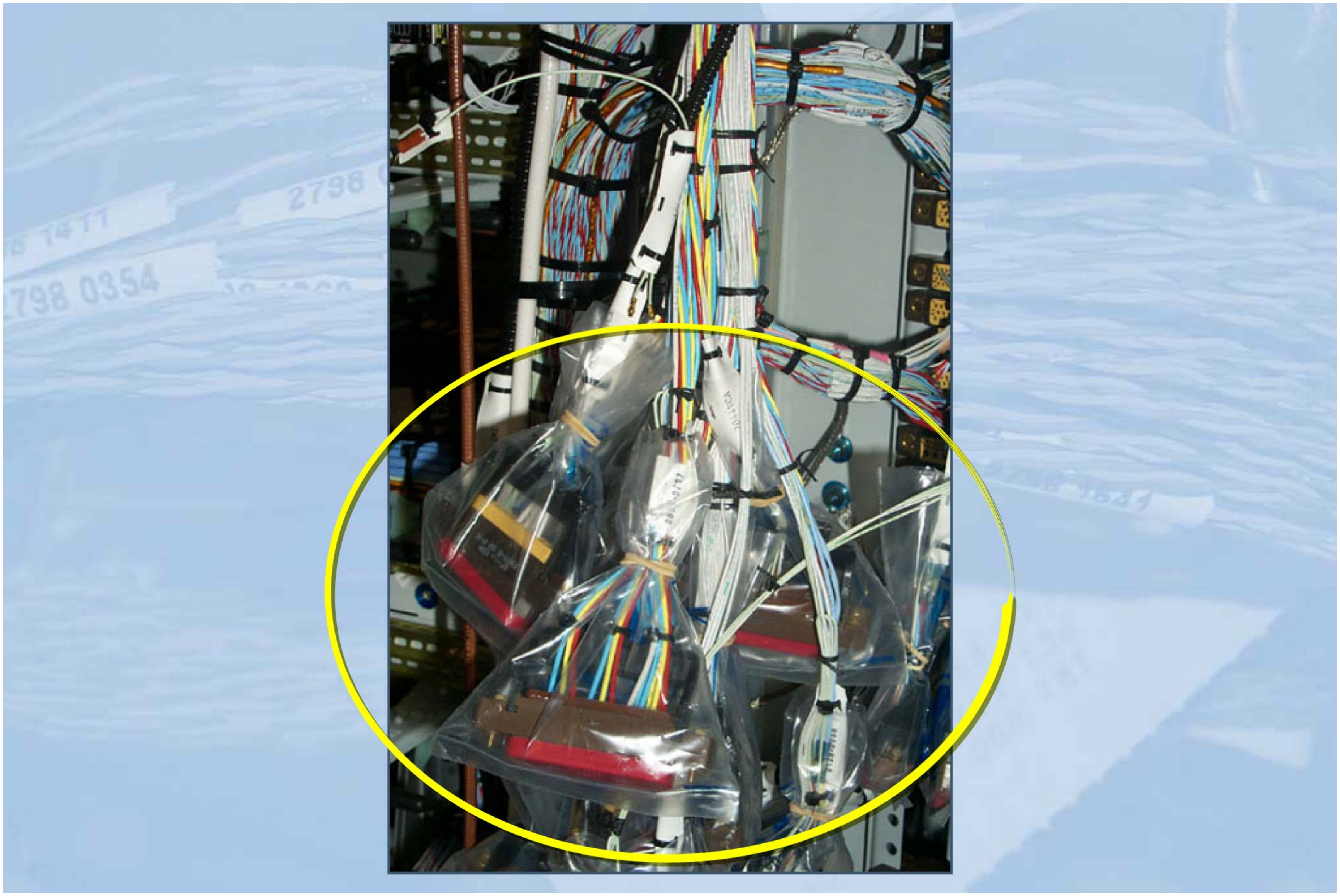
CAUTIONS AND PROTECTIONS

PROTECTION WITH SLEEVES

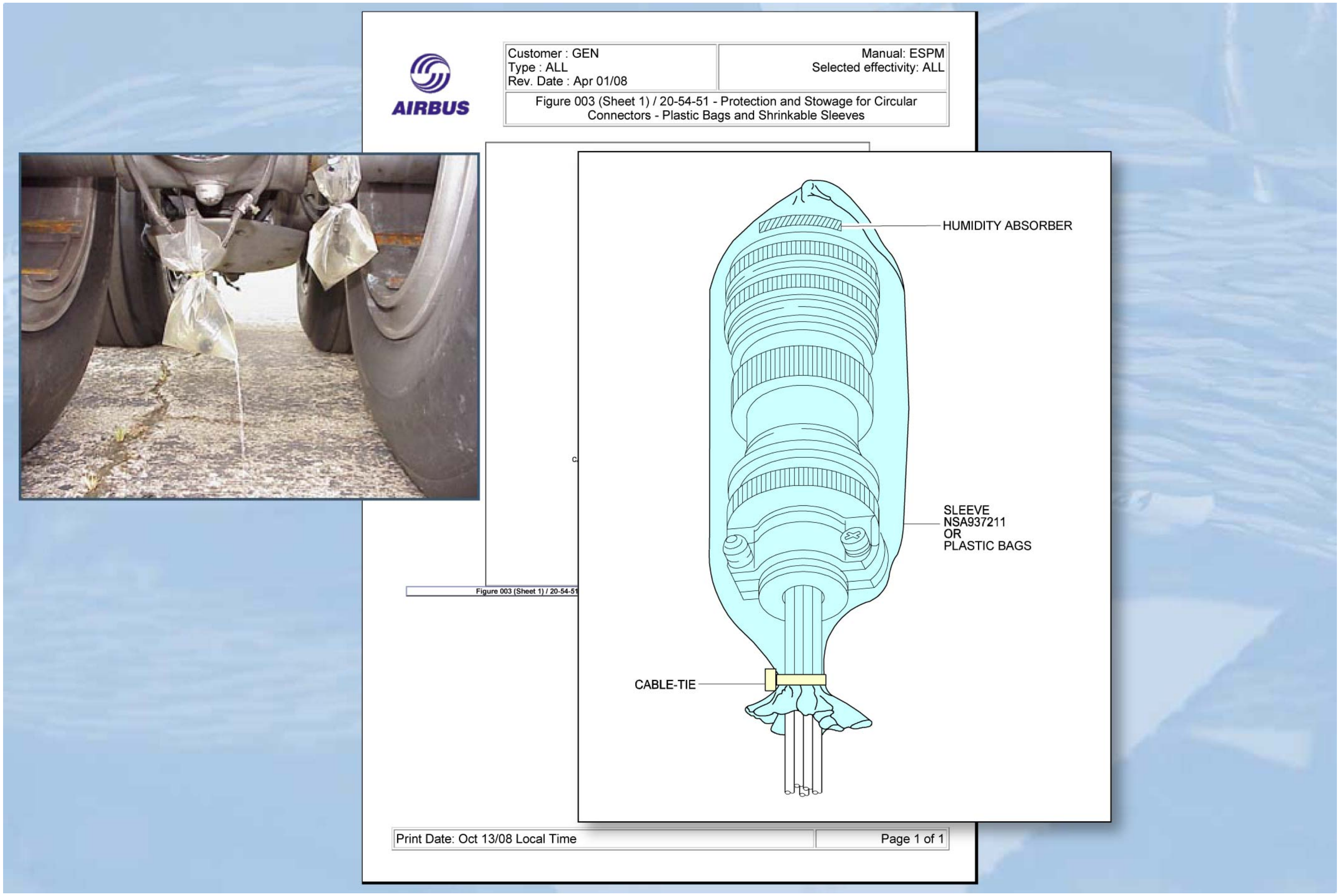
This module concerns the different protections that must be installed on connectors (Plug and Receptacle) during maintenance operations and in case of equipment disconnection.
Protection with sleeves:
These protections are used as an alternative protection if protective caps are not available to prevent contamination or damage on connectors' contacts.
This type of protection must be used temporarily because there is a risk of condensation under the sleeve or plastic bag.
It is however recommended to put a humidity absorber in the sleeve and to make a small hole in the lowest part of the bag.



PROTECTION WITH SLEEVES



PROTECTION WITH SLEEVES



PROTECTION WITH SLEEVES

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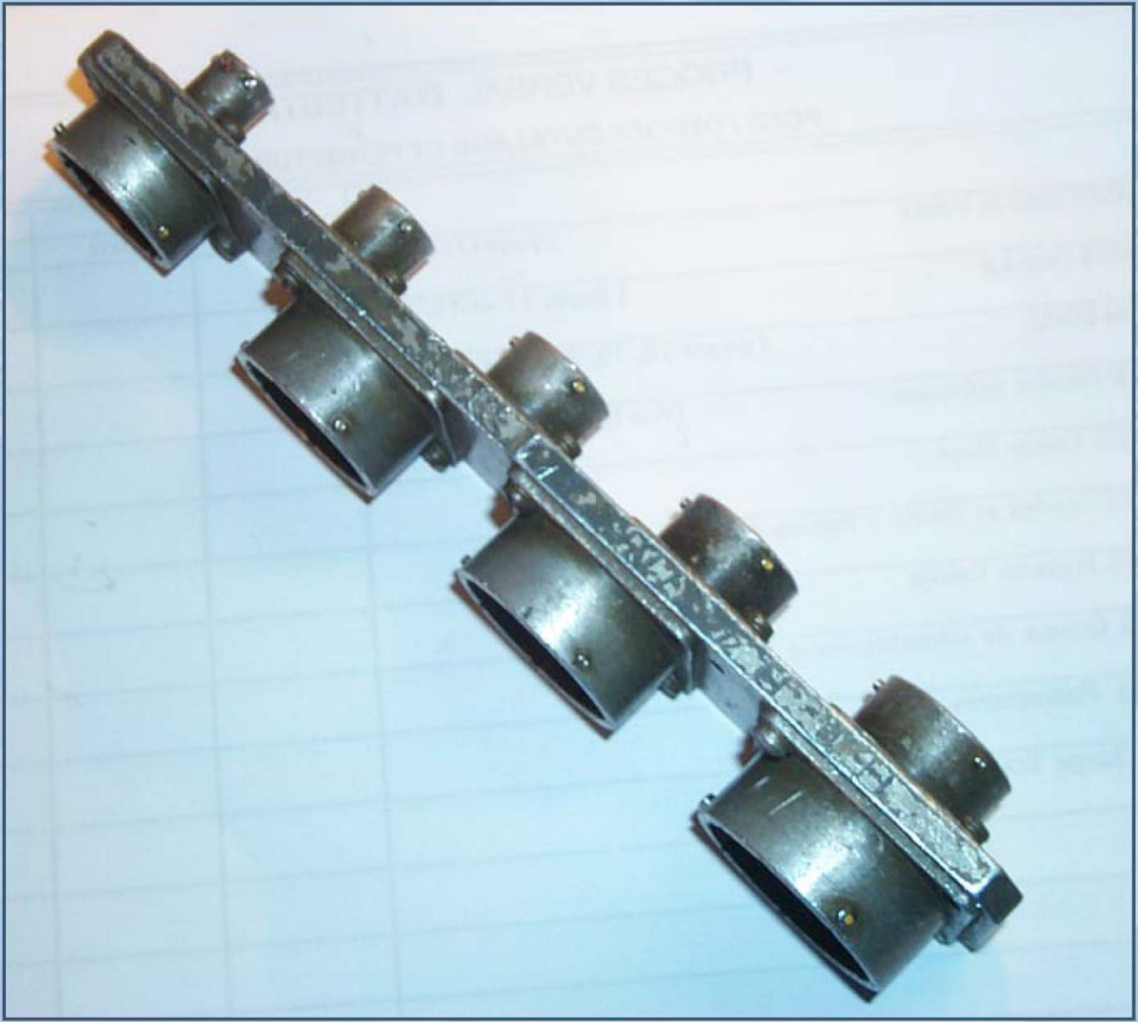
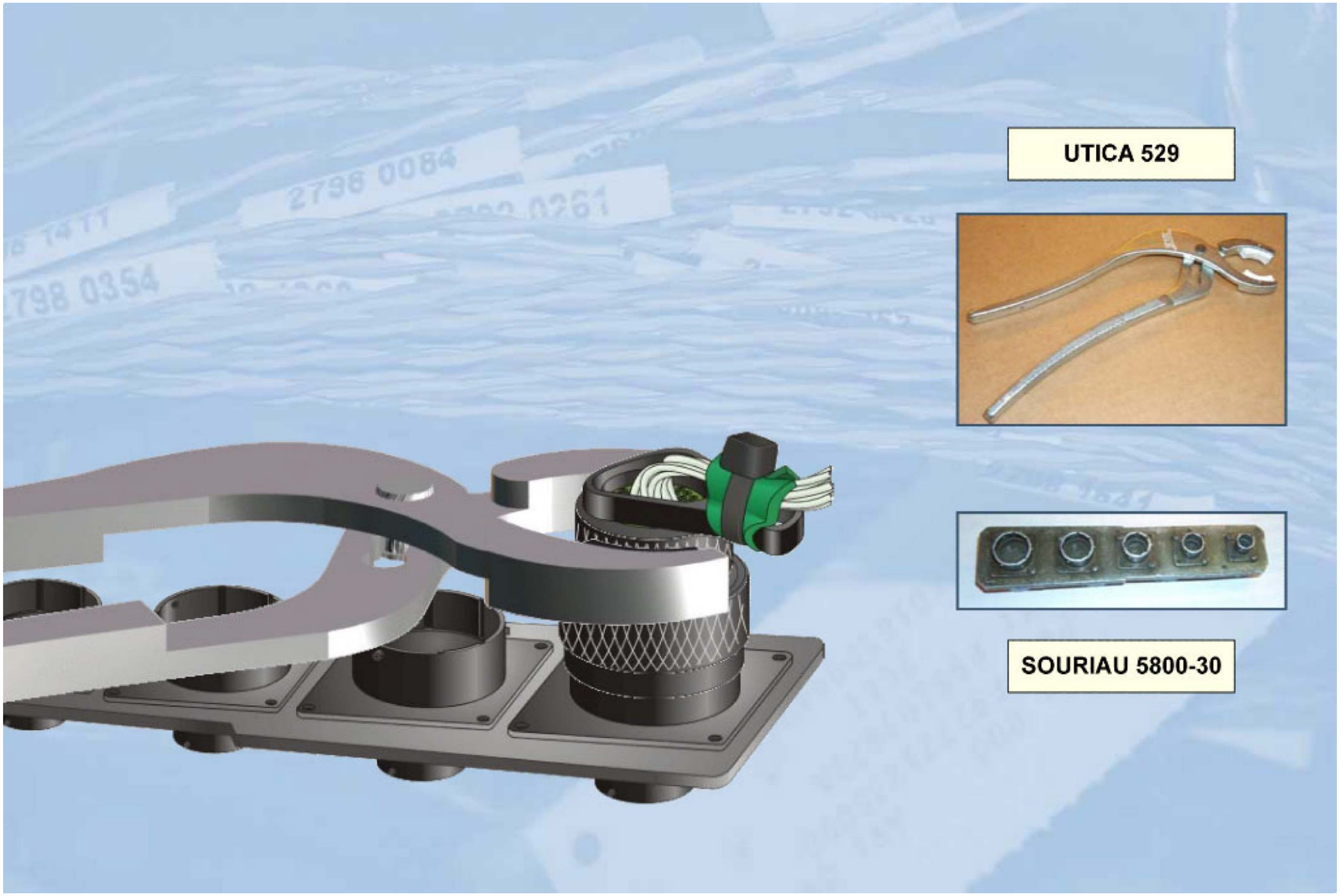
CAUTIONS AND PROTECTIONS

BACKSHELL INSTALLATION

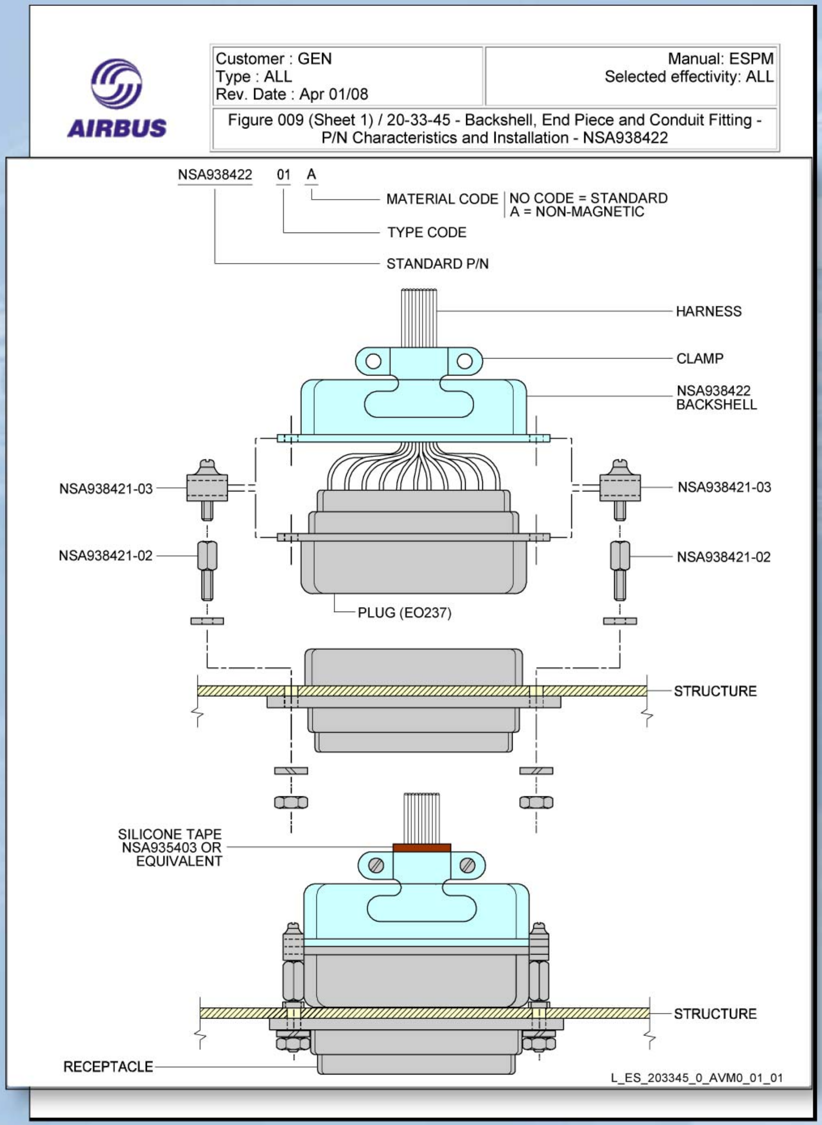
Example of backshell installation on aircraft.
Typical example of backshell installation:
Screw the backshell onto the connector with the SOURIAU 5800 30 tightening support and UTICA 529 pliers or equivalent.
For other backshell types, the installation is shown on the following relevant pages of the ESPM.
For other backshell types, the installation is shown on the relevant pages of the ESPM.

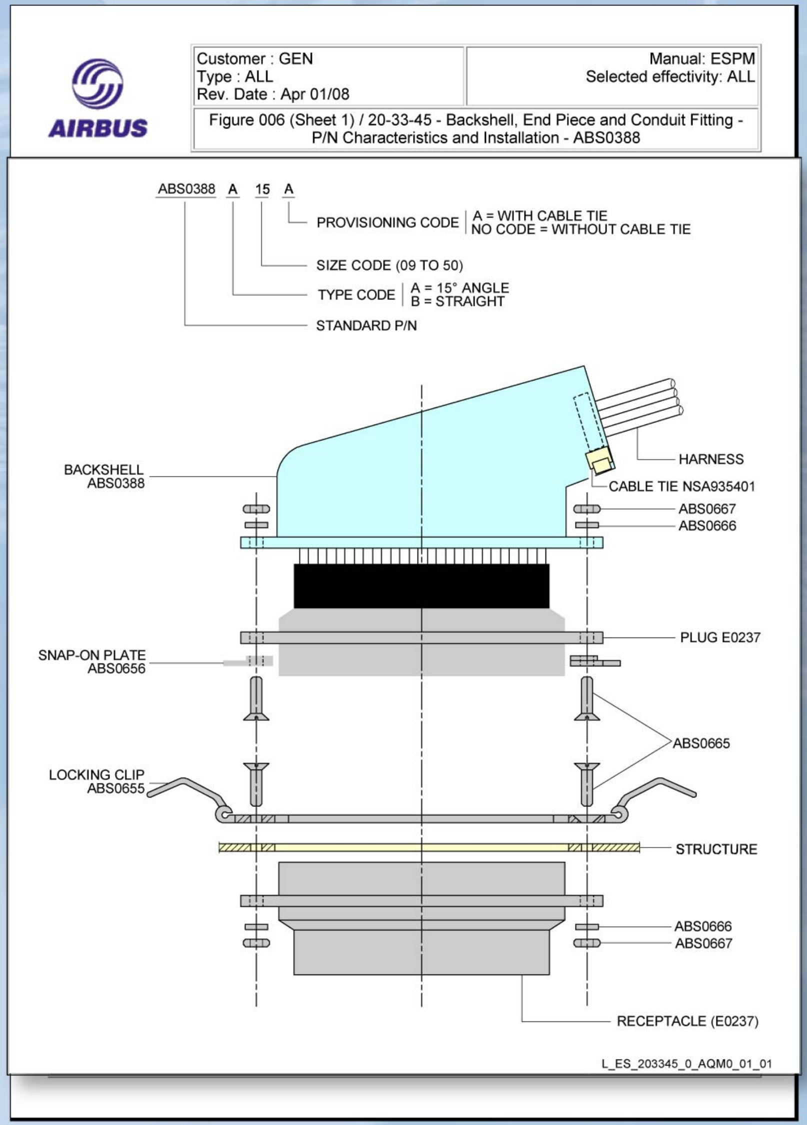


BACKSHELL INSTALLATION



BACKSHELL INSTALLATION



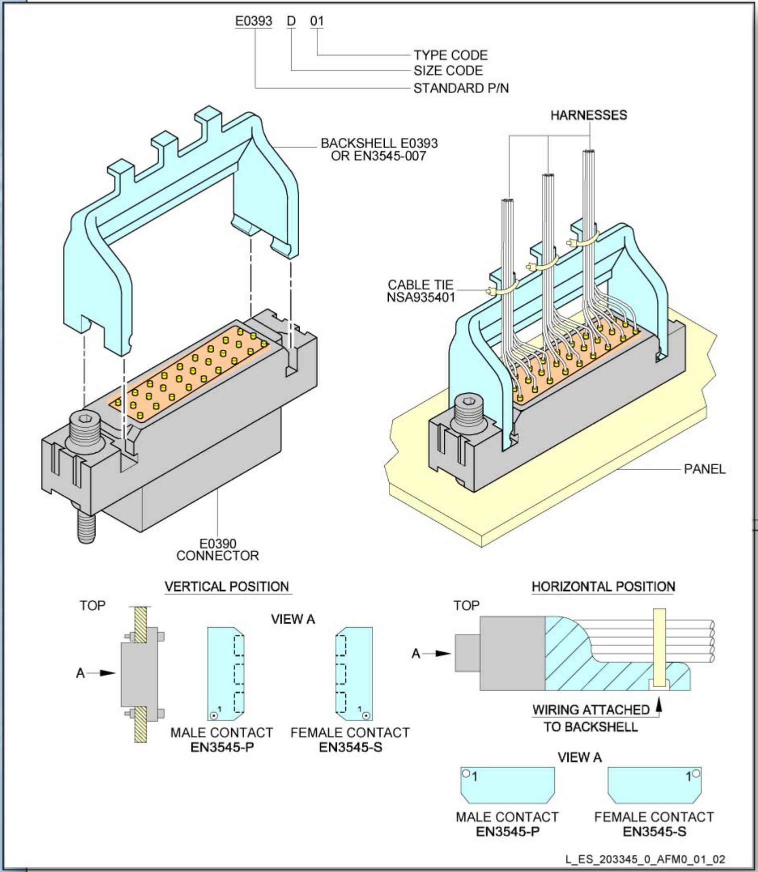


BACKSHELL INSTALLATION

X8U08481 - X0332T0 - XM2033000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-33-45 - Backshell, End Piece and Conduit Fitting - P/N Characteristics and Installation - E0393 and EN3545-007



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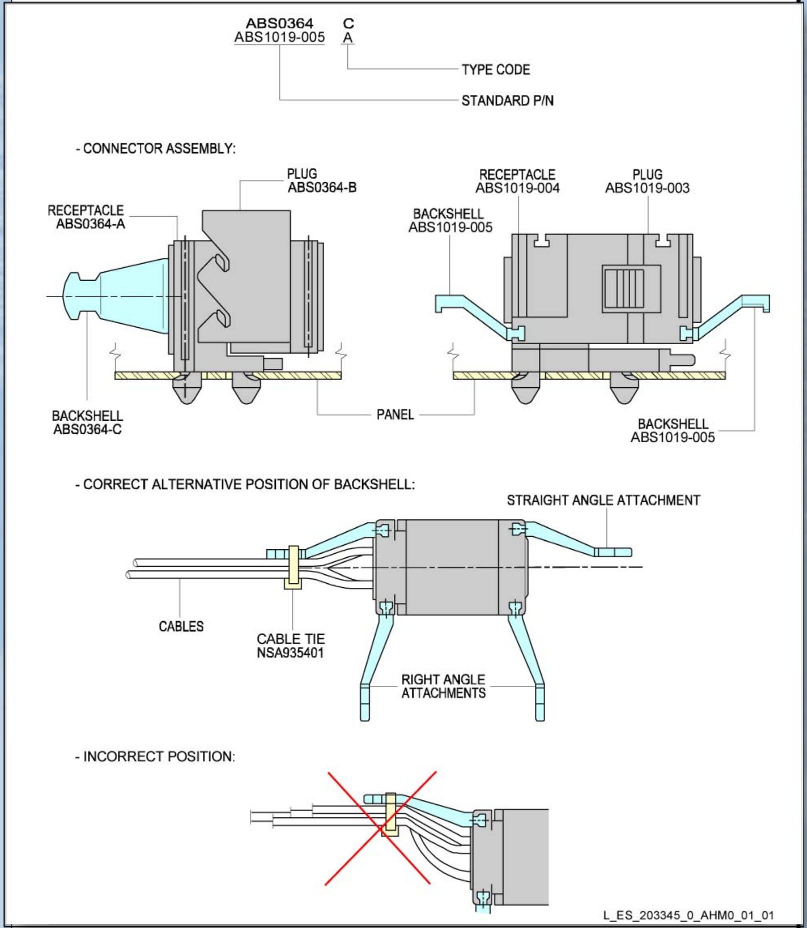
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-33-45 - Backshell, End Piece and Conduit Fitting - P/N Characteristics and Installation - ABS0364-C and ABS1019-005



BACKSHELL INSTALLATION

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CAUTIONS AND PROTECTIONS

LOCKWIRING PROCEDURE

This module describes the locking procedures used on aircraft:
- locking with wire.
- locking with adhesive product.

Locking with wire:
- Screw the connector on the connecting part.
- Tighten the assembly with UTICA pliers or equivalents.
- Insert the lockwire in the connector lockwire hole.
- Twist the lockwire with pliers.
- Insert the lockwire end through the appropriate hole.
- Twist the lockwire.
- Cut the excess length to a length of 15 mm (0.5905 in.).
- Bend back the end of the lockwire.

Further details are given in the ESPM about the procedure/materials to use, etc...

These are other examples of lockwiring.

Another locking procedure is made by applying adhesive product.

Depending on the assembly (Locking type selection).

Depending on the assembly (Locking type selection).

X8U08481 - X0332T0 - XM203300000001

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

LOCKING PROCEDURE FOR CIRCULAR CONNECTORS - DESCRIPTION AND OPERATION

1. General

This chapter gives two methods to lock electrical circular connectors on the connecting part on/and connector to backshell.

NOTE : Each time that a connector safetied by lockwire or an adhesive product is disconnected for maintenance, the connector assembly must be re-locked after its re-installation.

2. Standard Procedure

For safetying connectors two types of locking exist:
- locking with a wire,
- locking with an adhesive product.

A. Lockwiring Procedure

(1) Material

Locking pliers ref. BELZER VAN EXTRA 2855 or equivalent.
Lockwire stainless steel 0.6 mm (0.0236 in.) dia. (Mat. 19-018).
Lockwire 0.5 mm (0.0196 in.) (Ams 5687) (Mat. 19-009).
Lockwire 0.8 mm (0.0314 in.) (Mat. 19-010).

(2) Main rules and instructions
- Lockwire must be used only once.
- The lockwire diameter must be adapted to the hole diameter.
- Lockwire must not be bent excessively on cutting edges, lugs, etc.
- According to the lockwire diameter, the number of authorized turns must be complied with to avoid excessive twisting and therefore strain on the wire.
- All parts must be locked so that the wire is under slight tension in the counter-rotation direction when the elements are disconnected.
- When the screws and screw heads are locked by lockwire, make sure the lockwire is twisted downwards around the screw and cannot slide over the head, as this could cause disconnection.

(3) Typical procedure
(Ref. Fig. 001, 002)
- Screw the connector on the connecting part.
- Tighten the assembly with pliers UTICA or equivalent.
- Insert the lockwire through the lockwire hole (Ref. STEP 1).
- Twist the lockwire with the locking pliers at a sufficient length (Ref. STEP 2).

EFF : ALL

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LOCKWIRING PROCEDURE

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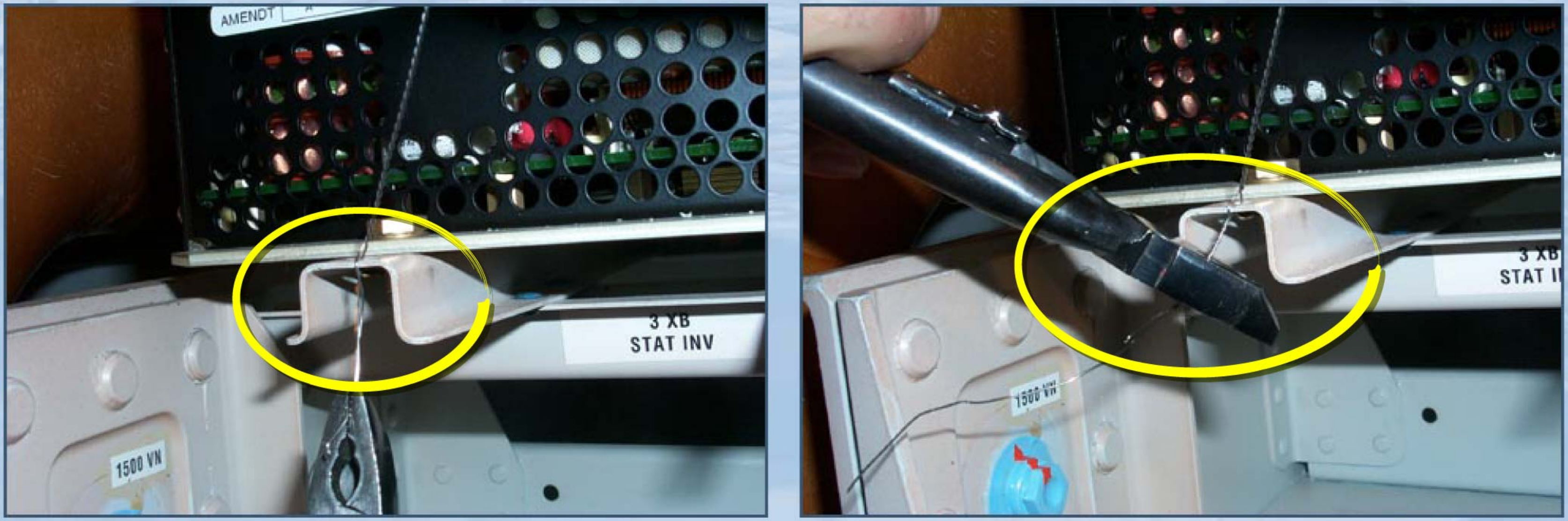
LOCKWIRING PROCEDURE

LOCKWIRING PROCEDURE



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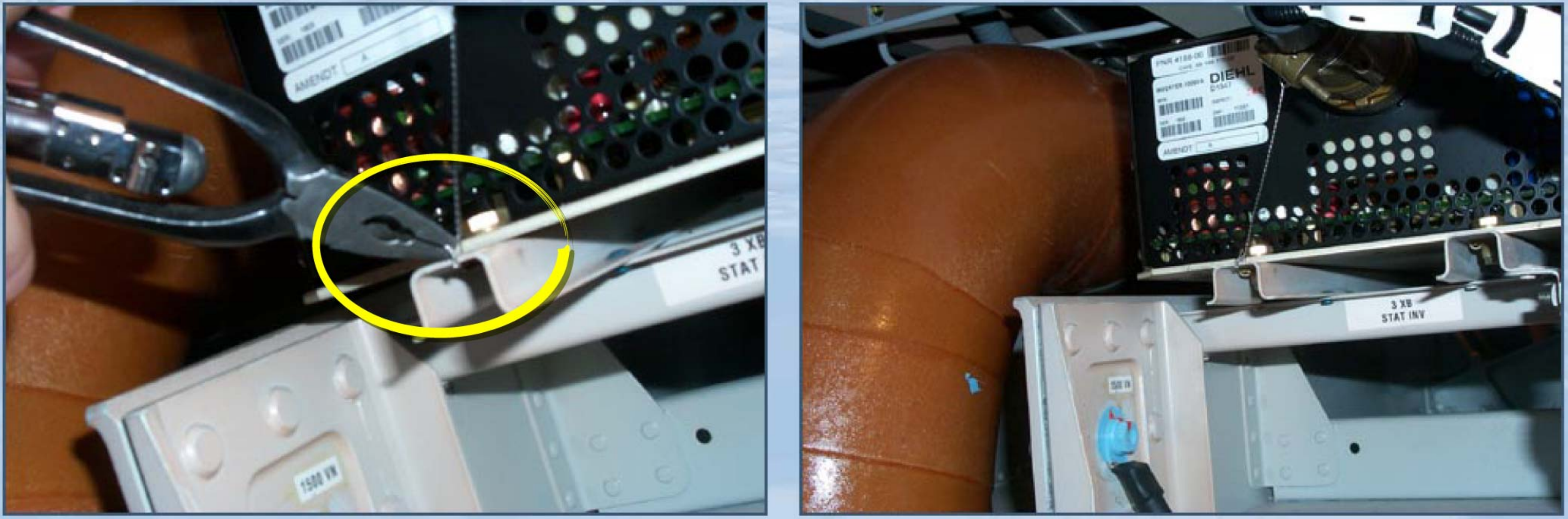

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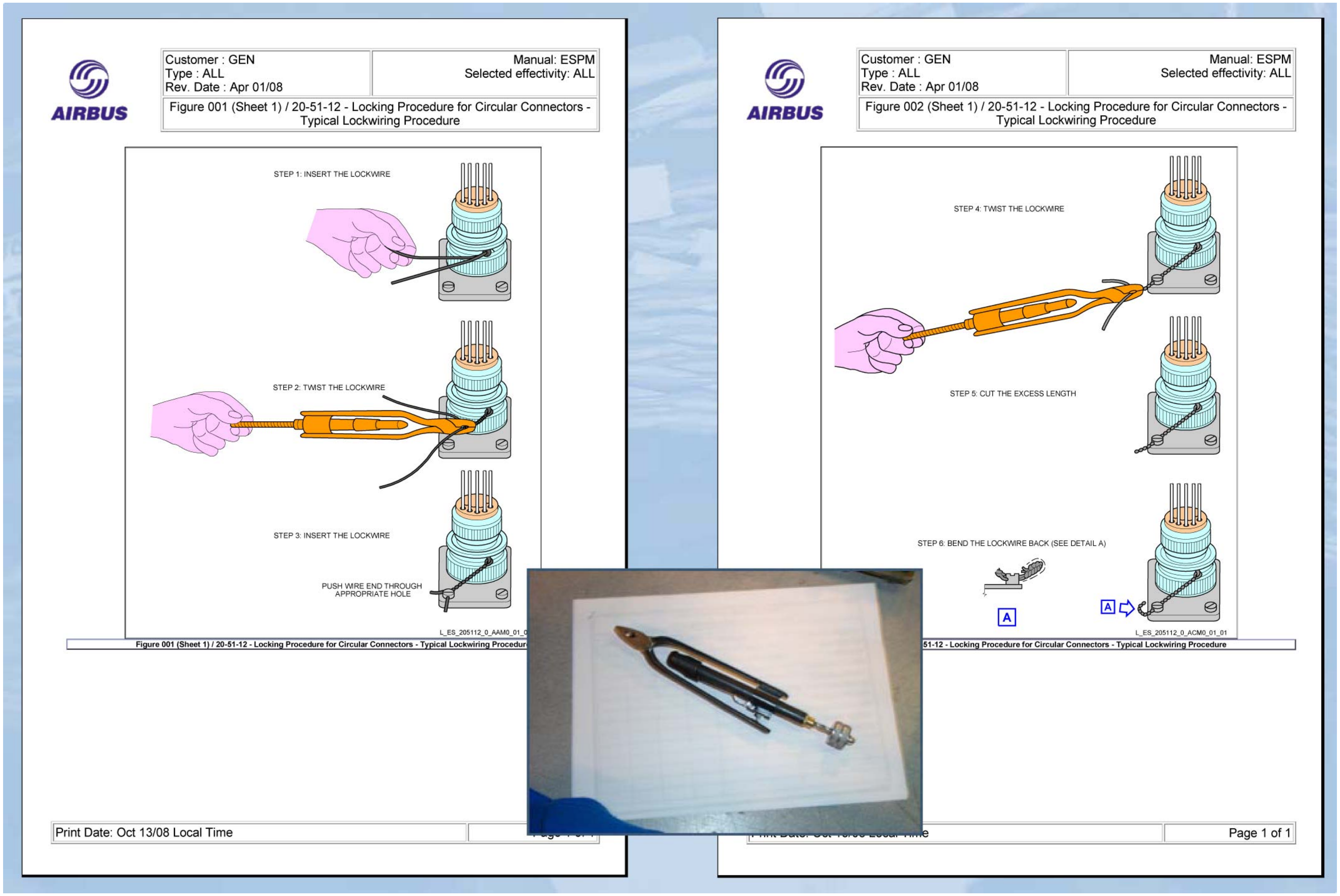

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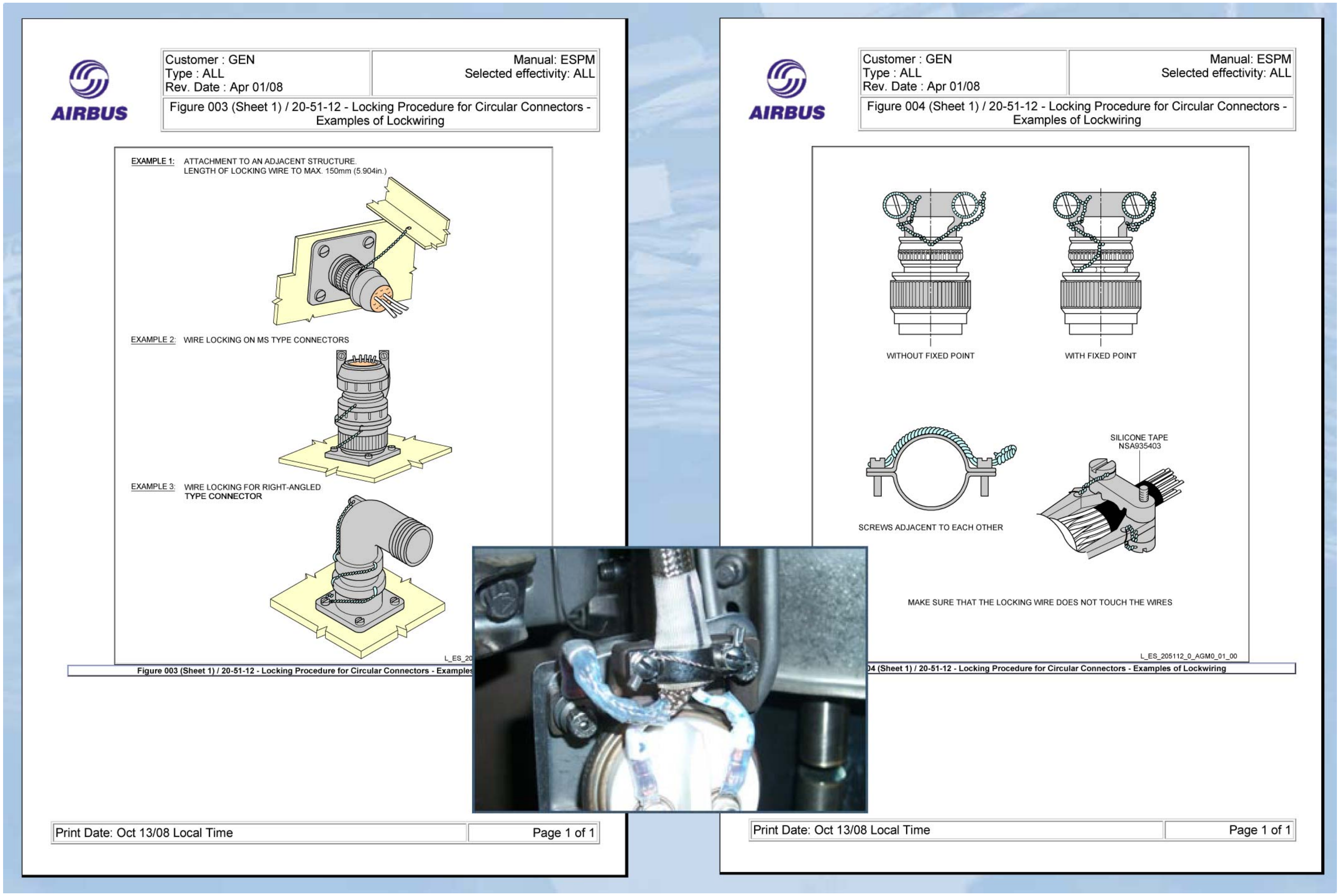

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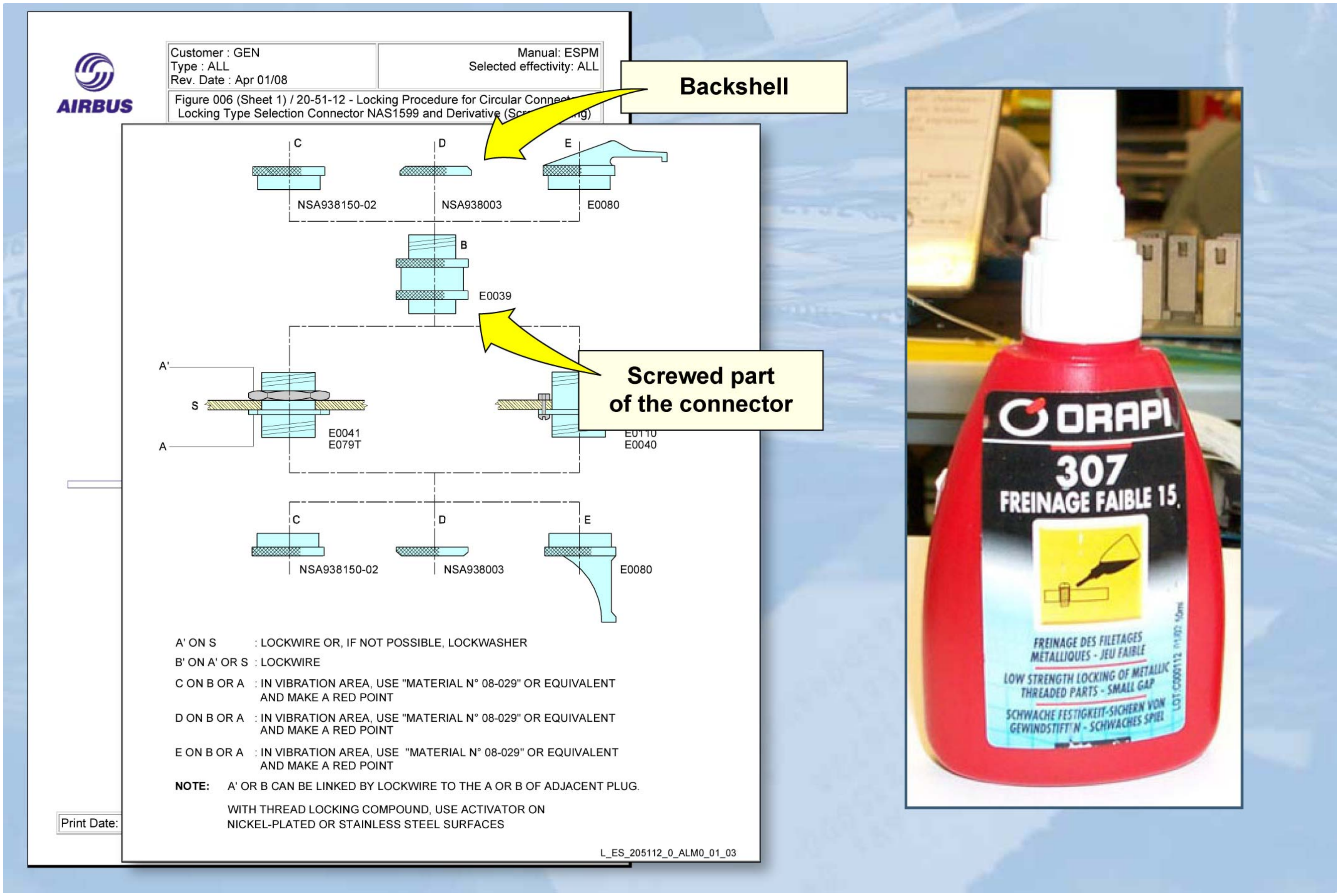
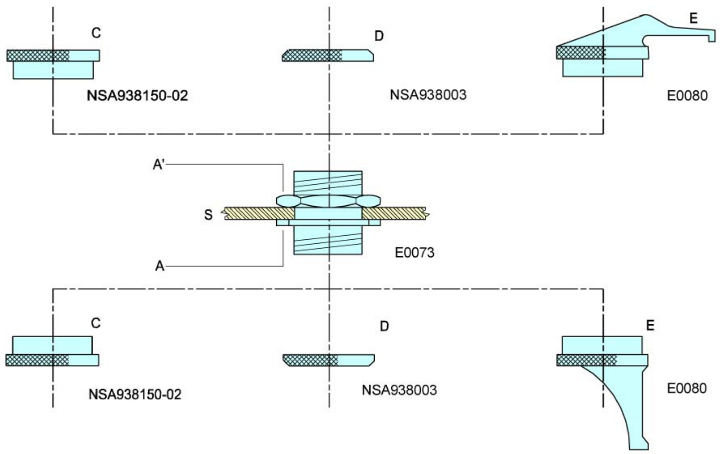
LOCKWIRING PROCEDURE



LOCKWIRING PROCEDURE

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 005 (Sheet 1) / 20-51-12 - Locking Procedure for Circular Connectors - Locking Type Selection Pressure Seal E0073



A' ON S : LOCKWIRE OR IF NOT POSSIBLE, LOCKWASHER
A' ON A : IN VIBRATION AREA, USE "MATERIAL N° 08-029" OR EQUIVALENT AND MAKE A RED POINT MARK
C ON A : IN VIBRATION AREA, USE "MATERIAL N° 08-029" OR EQUIVALENT AND MAKE A RED POINT MARK
D ON A : IN VIBRATION AREA, USE "MATERIAL N° 08-029" OR EQUIVALENT AND MAKE A RED POINT MARK
E ON A : IN VIBRATION AREA, USE "MATERIAL N° 08-029" OR EQUIVALENT AND MAKE A RED POINT MARK

NOTE : A' CAN BE LINKED TO OTHER A' ADJACENT PLUG

WITH THREAD LOCKING COMPOUND, USE ACTIVATOR ON NICKEL-PLATED OR STAINLESS STEEL SURFACES

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LOCKWIRING PROCEDURE

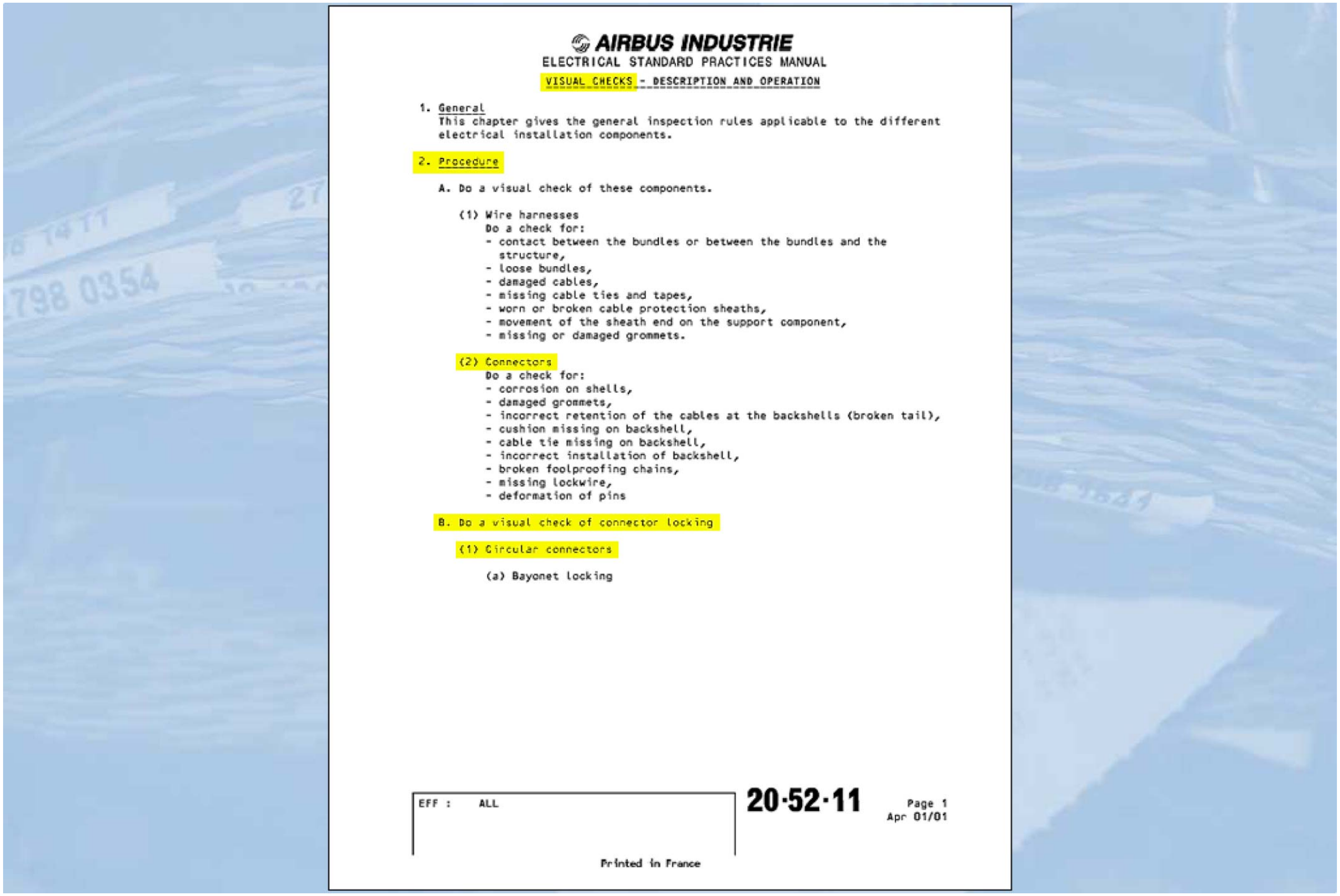
LOCKWIRING PROCEDURE

VISUAL INSPECTION PROCEDURES

VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

Visual inspection of connectors.
On the connector, check for:
- Traces of corrosion (discoloration).
- Damaged grommets.
- Incorrect retention of the wires at the backshell (broken tail).
- Cushion missing on the backshell.
- Cable tie missing on the backshell.
- Incorrect installation of the backshell.
- Broken foolproofing chains.
- Missing lockwire (when needed).
- Deformation of pins.
- Liquid contamination.

Circular connector locking.
Make sure the locking stud is visible.
Or make sure you do not see the color band.
Rectangular connector locking.
For these connectors, make sure that the slider plate is in the correct position, the locking studs are visible or you can see the levers.
Also check the lockwire and the inspection stamps to make sure the connector is well connected.
Check for:
- Incorrect tightening of terminals blocks.
- Damaged dielectric protection.



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
VISUAL CHECKS - DESCRIPTION AND OPERATION

1. General
This chapter gives the general inspection rules applicable to the different electrical installation components.

2. Procedure

A. Do a visual check of these components.

(1) Wire harnesses
Do a check for:
- contact between the bundles or between the bundles and the structure,
- loose bundles,
- damaged cables,
- missing cable ties and tapes,
- worn or broken cable protection sheaths,
- movement of the sheath end on the support component,
- missing or damaged grommets.

(2) Connectors
Do a check for:
- corrosion on shells,
- damaged grommets,
- incorrect retention of the cables at the backshells (broken tail),
- cushion missing on backshell,
- cable tie missing on backshell,
- incorrect installation of backshell,
- broken foolproofing chains,
- missing lockwire,
- deformation of pins

B. Do a visual check of connector locking

(1) Circular connectors

(a) Bayonet locking

EFF : ALL

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VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

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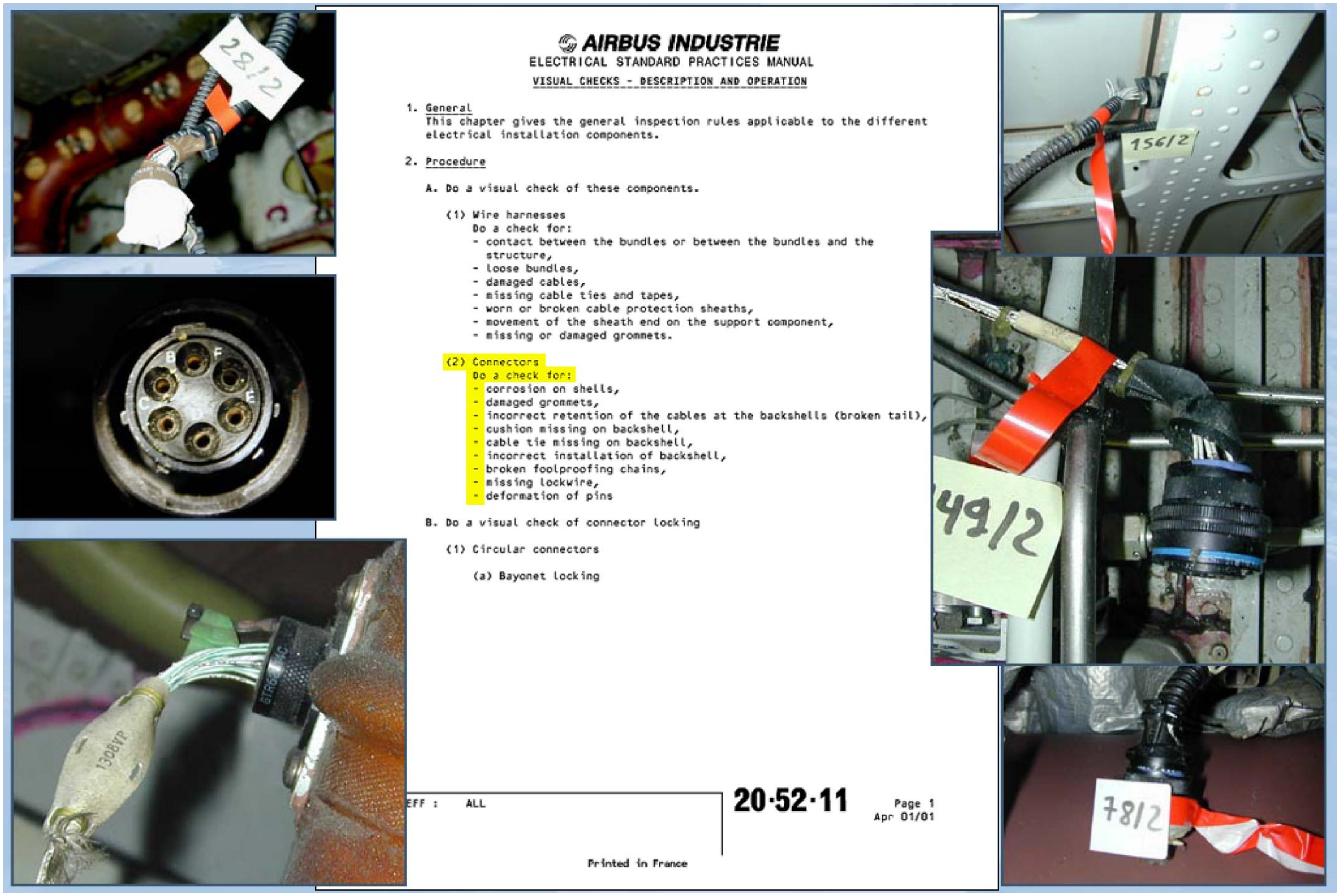

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
VISUAL CHECKS - DESCRIPTION AND OPERATION

1. General
   This chapter gives the general inspection rules applicable to the different electrical installation components.

2. Procedure

   A. Do a visual check of these components.

      (1) Wire harnesses
          Do a check for:
          - contact between the bundles or between the bundles and the structure,
          - loose bundles,
          - damaged cables,
          - missing cable ties and tapes,
          - worn or broken cable protection sheaths,
          - movement of the sheath end on the support component,
          - missing or damaged grommets.

      (2) Connectors
          Do a check for:
          - corrosion on shells,
          - damaged grommets,
          - incorrect retention of the cables at the backshells (broken tail),
          - cushion missing on backshell,
          - cable tie missing on backshell,
          - incorrect installation of backshell,
          - broken foolproofing chains,
          - missing lockwire,
          - deformation of pins

   B. Do a visual check of connector locking

      (1) Circular connectors

          (a) Bayonet locking

EFF : ALL

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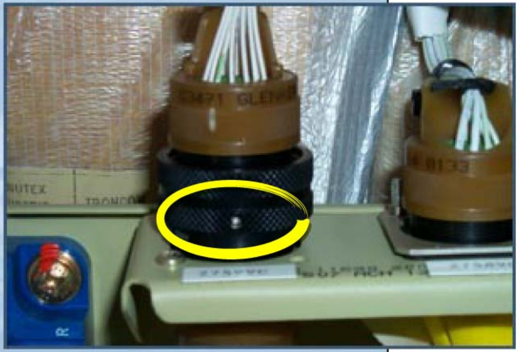
VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2034000000001

VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS



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ELECTRICAL STANDARD PRACTICES MANUAL

P/N	NORM	CHECK
E0052 E0053 E0054	NAS1599 SIMPLIFIED	Make sure that: -You can see the locking studs through the coupling nut -You can hear a "click" at the end of locking.
NSA938026	MIL C 38999 SERIES I	
NSA938027 NSA938028	MIL C 38999 SERIES II	
E0186 E0187	MIL C 38999 SERIES III B	
E0076 E0150	MIL C 26482	

(b) Screw-type ... (Possibility ...

(c) Screw-type locking and clicker nut

P/N	NORM	CHECK
NSA938925 E0111 E0233	MIL C 5015	Make sure that the connector is correctly screwed. Make sure that the lockwire is not broken (if installed)

EFF : ALL

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Apr 01/01

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VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

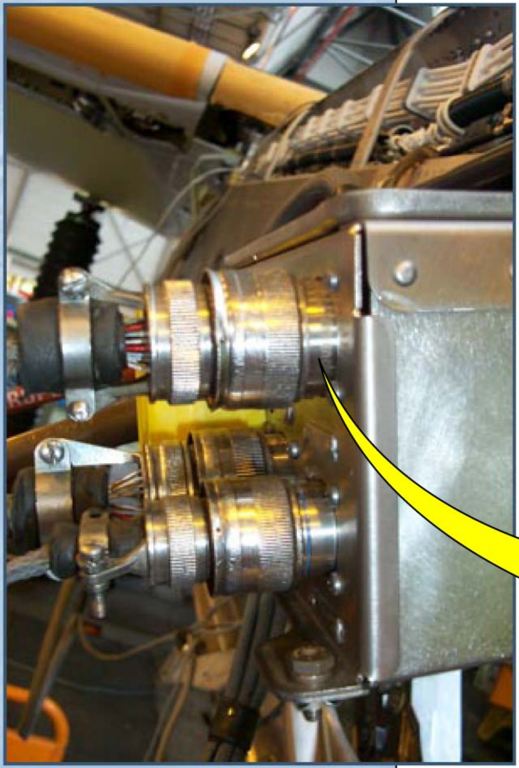
X8U08481 - X0332T0 - XM2034000000001

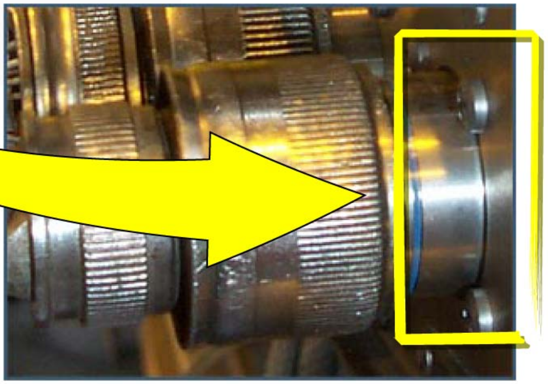
AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

P/N	NORM	CHECK
E0039 E0040 E0041	NAS1599 SIMPLIFIED	
E0093 E0094	MIL C 5015	Make sure that you do not see the color band after locking.
E0195 E0197	MIL 83723 SERIES III T	
E0320 E0322	MIL 83723 SERIES III T	

(d) Screw-type locking (Self locking)

P/N	NORM	CHECK
E0441 E0442 E0444 E0451 E0452 E0454	MIL 83723 SERIES III T	Make sure that you do not see the color band after locking.
EN 2997	----	





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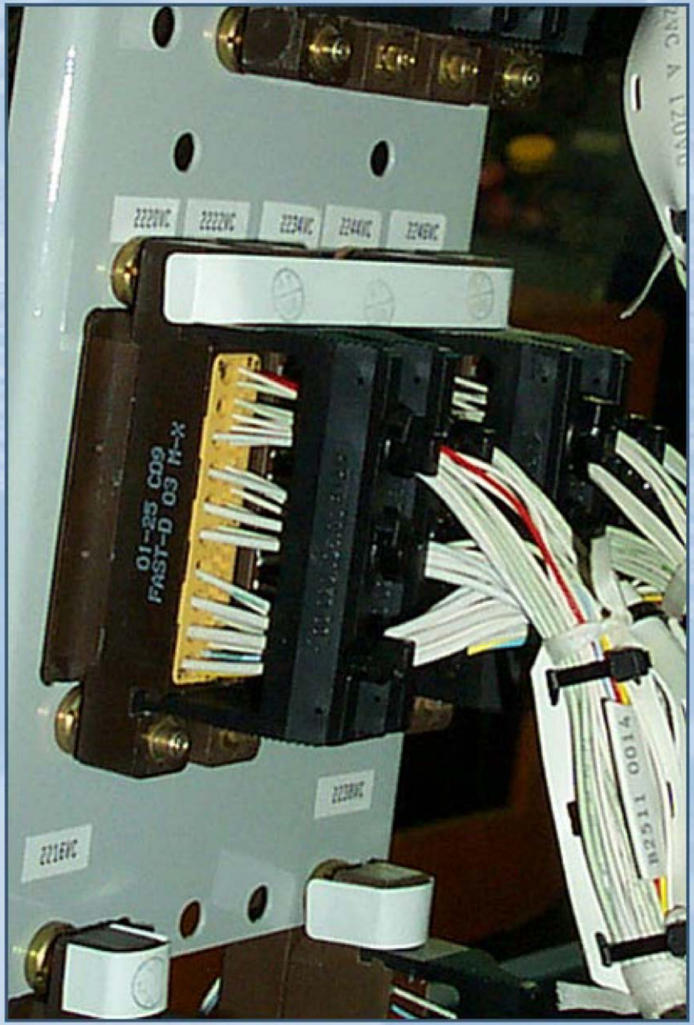
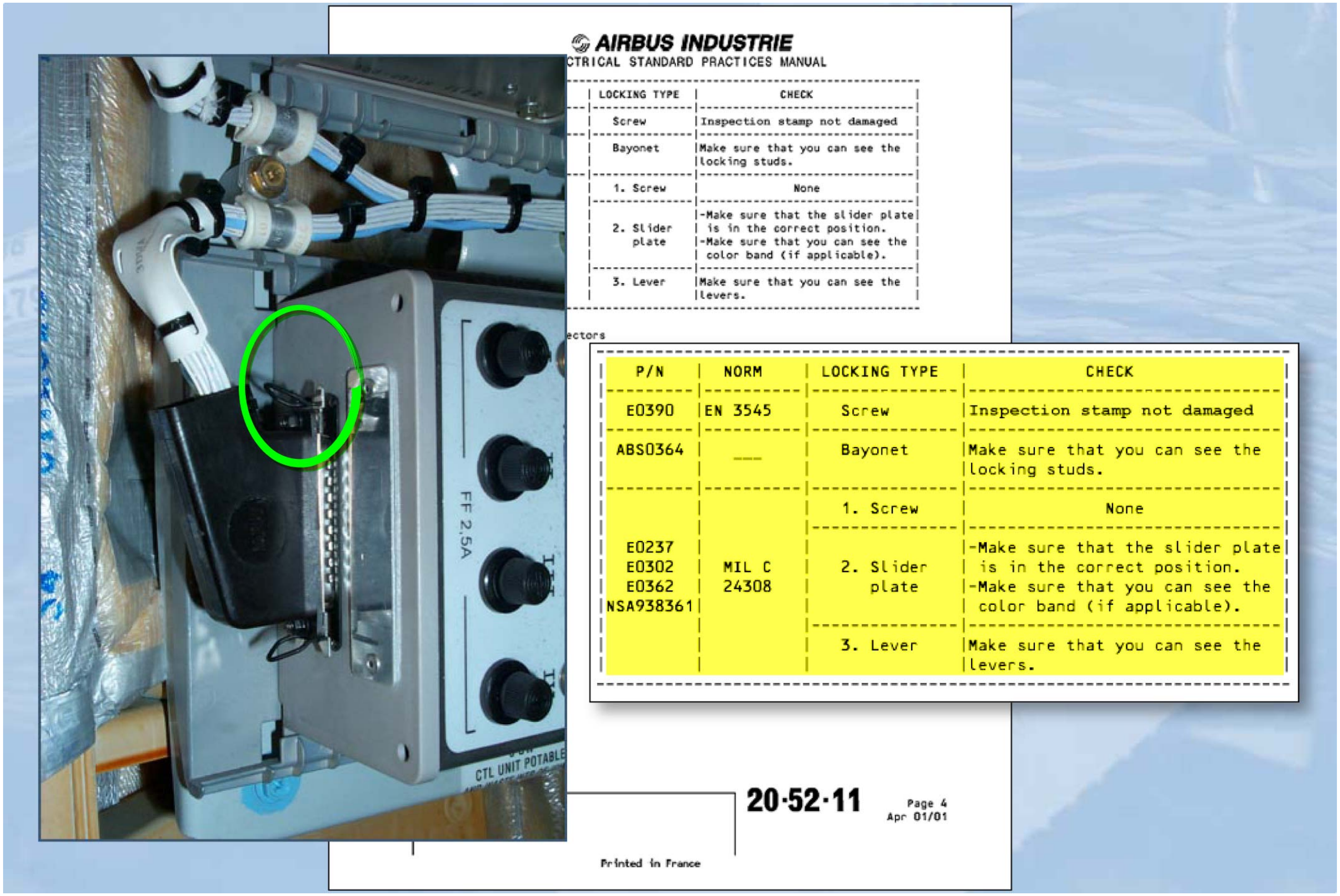
VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

X8U08481 - X0332T0 - XM2034000000001



VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

X8U08481 - X0332T0 - XM20340000000001



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

ectors

P/N	NORM	LOCKING TYPE	CHECK
E0390	EN 3545	Screw	Inspection stamp not damaged
ABS0364	___	Bayonet	Make sure that you can see the locking studs.
E0237 E0302 E0362 NSA938361	MIL C 24308	1. Screw	None
		2. Slider plate	-Make sure that the slider plate is in the correct position. -Make sure that you can see the color band (if applicable).
		3. Lever	Make sure that you can see the levers.

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VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

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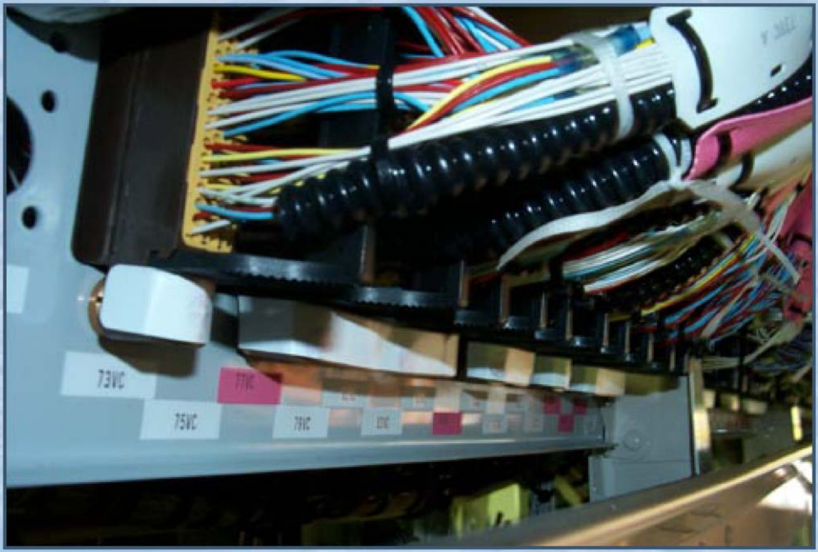

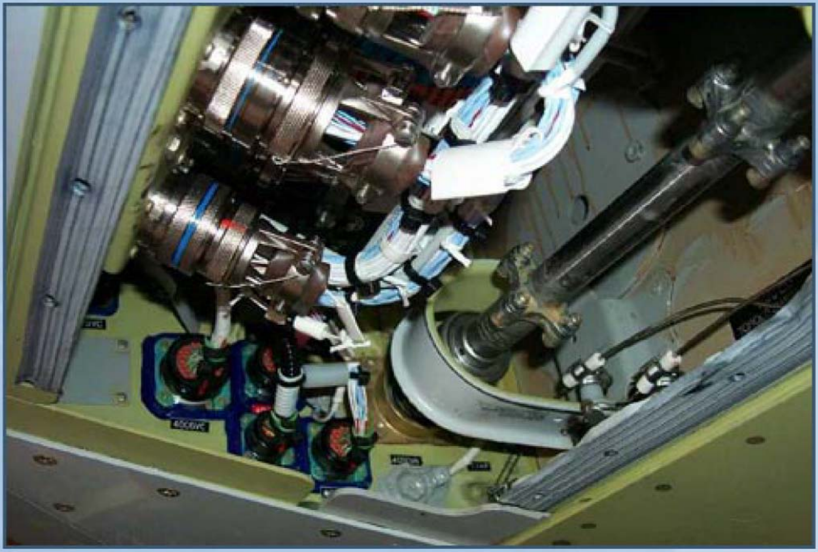

VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

VISUAL CHECKS OF CONNECTORS/CONNECTOR LOCKING/TERMINAL BLOCKS

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TYPICAL DAMAGE FOUND

CIRCULAR CONNECTORS / BACKSHELLS

This topic will give you typical damage found on the connectors and their associated backshell.
These typical types of damage are listed in the following table for:
- the connectors.

These typical types of damage are listed in the following table for:
- the backshells.

X8U08481 - X0332T0 - XM2035000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

DAMAGE CASES
REAR SEAL OR GROMMET:
SHELL OR HOUSING:
HARD INSULATOR:
INTERFACES OR COUPLING SEAL:
CONTACT RETENTION CLIP:
LOCATING DEVICE:
LOCKING DEFECTIVE:
CONNECTOR CONTAMINATION BY:
BLANKING PLUG/ PROTECTIVE COVER:

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN - BACK THREADS DAMAGED	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE CONNECTOR
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE CONNECTOR
LOCKING DEFECTIVE:	- INOPERATIVE	REPLACE THE DEFECTIVE CONNECTOR (MALE OR FEMALE)
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
BLANKING PLUG/ PROTECTIVE COVER:	- LOST	INSTALL BLANKING PLUG

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Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

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CIRCULAR CONNECTORS / BACKSHELLS

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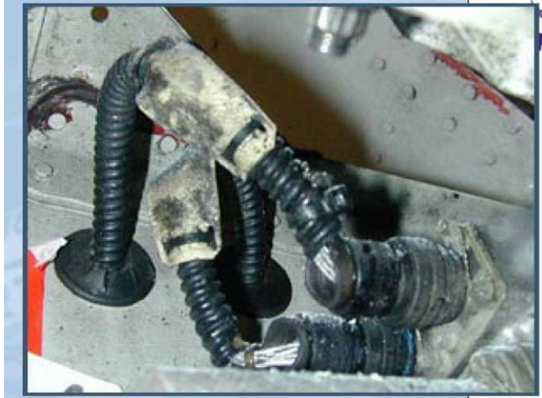

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN - BACK THREADS DAMAGED	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE CONNECTOR
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE CONNECTOR
LOCKING DEFECTIVE:	- INOPERATIVE	REPLACE THE DEFECTIVE CONNECTOR (MALE OR FEMALE)
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
BLANKING PLUG/ PROTECTIVE COVER:	- LOST	INSTALL BLANKING PLUG

DAMAGE CASES
REAR SEAL OR GROMMET:
SHELL OR HOUSING:
HARD INSULATOR:
INTERFACES OR COUPLING SEAL:
CONTACT RETENTION CLIP:
LOCATING DEVICE:
LOCKING DEFECTIVE:
CONNECTOR CONTAMINATION BY:
BLANKING PLUG/ PROTECTIVE COVER:

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Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

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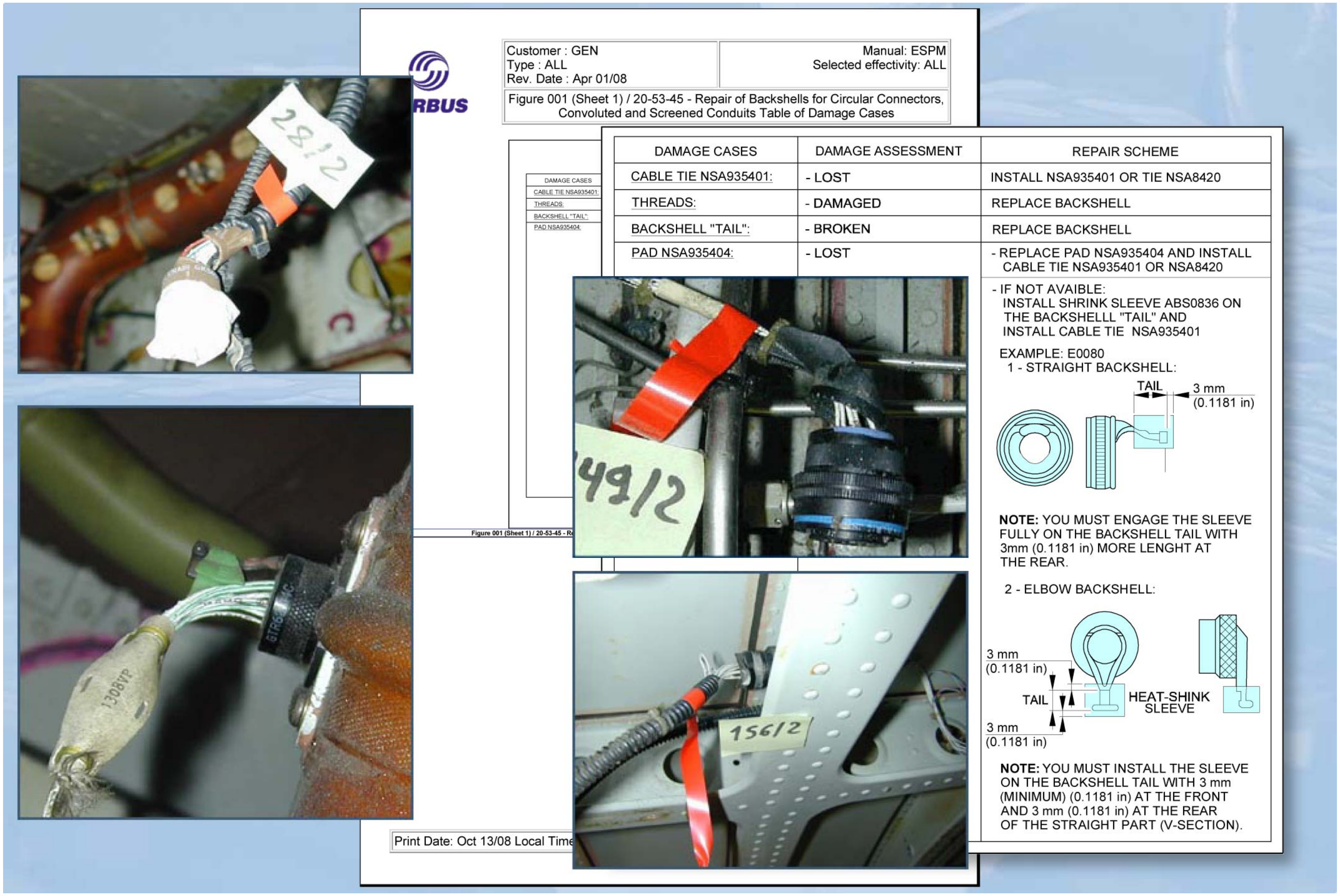
X8U08481 - X0332T0 - XM2035000000001

CIRCULAR CONNECTORS / BACKSHELLS



Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-53-45 - Repair of Backshells for Circular Connectors, Convoluted and Screened Conduits Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
CABLE TIE NSA935401:	- LOST	INSTALL NSA935401 OR TIE NSA8420
THREADS:	- DAMAGED	REPLACE BACKSHELL
BACKSHELL "TAIL":	- BROKEN	REPLACE BACKSHELL
PAD NSA935404:	- LOST	- REPLACE PAD NSA935404 AND INSTALL CABLE TIE NSA935401 OR NSA8420 - IF NOT AVAIBLE: INSTALL SHRINK SLEEVE ABS0836 ON THE BACKSHELLL "TAIL" AND INSTALL CABLE TIE NSA935401 EXAMPLE: E0080 1 - STRAIGHT BACKSHELL: **NOTE:** YOU MUST ENGAGE THE SLEEVE FULLY ON THE BACKSHELL TAIL WITH 3mm (0.1181 in) MORE LENGHT AT THE REAR. 2 - ELBOW BACKSHELL: **NOTE:** YOU MUST INSTALL THE SLEEVE ON THE BACKSHELL TAIL WITH 3 mm (MINIMUM) (0.1181 in) AT THE FRONT AND 3 mm (0.1181 in) AT THE REAR OF THE STRAIGHT PART (V-SECTION).

CIRCULAR CONNECTORS / BACKSHELLS

X8U08481 - X0332T0 - XM2035000000001

TYPICAL DAMAGE FOUND

RECTANGULARS CONNECTORS

Typical damage found on rectangular connectors.
These typical types of damage are listed in the following table for:
- rectangular connectors.

These typical types of damage are listed in the following table for:
- ARINC type connectors.

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE CONNECTOR
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE POLARIZATION KEYS
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
BLANKING PLUG/ PROTECTIVE COVER:	- LOST	INSTALL BLANKING PLUG/ PROTECTIVE COVER
LOCKING DEFECTIVE:		REPLACE LOCKING SCREW

DAMAGE CASES
REAR SEAL OR GROMI
SHELL OR HOUSING:
HARD INSULATOR:
INTERFACES OR COUPLING SEAL:
CONTACT RETENTION
LOCATING DEVICE:
LOCKING DEFECTIVE:
CONNECTOR CONTAMINATION BY:
NG PLUG/ TIVE COVER:

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igure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

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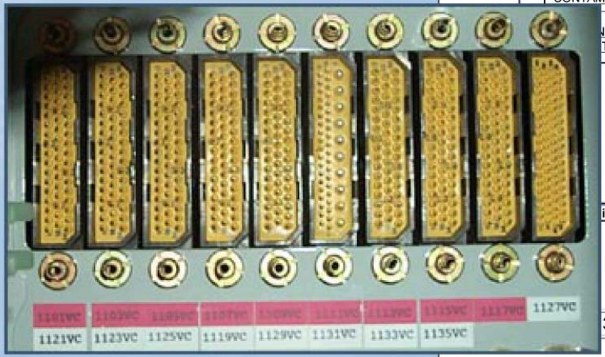

RECTANGULARS CONNECTORS

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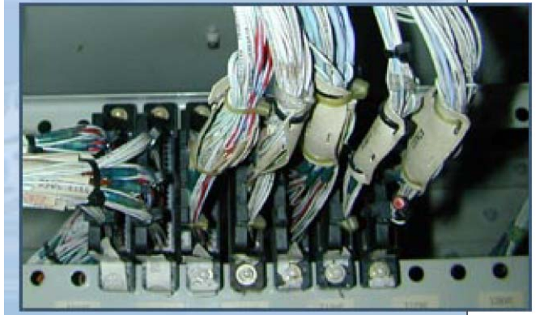

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE CONNECTOR
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE POLARIZATION KEYS
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
BLANKING PLUG/ PROTECTIVE COVER:	- LOST	INSTALL BLANKING PLUG/ PROTECTIVE COVER
LOCKING DEFECTIVE:		REPLACE LOCKING SCREW

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Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

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X8U08481 - X0332T0 - XM2035000000001

RECTANGULARS CONNECTORS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 006 (Sheet 1) / 20-53-51 - Repair of ARINC Type Connectors - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE MODULE (KEEP THE SAME MANUFACTURER)
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE MODULE (KEEP THE SAME MANUFACTURER)
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE LOCATING DEVICE OR POLARIZATION KEYS
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
LOCKING DEFECTIVE:	- INOPERATIVE	REPLACE LOCKING SYSTEM

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Figure 006 (Sheet 1) / 20-53-51 - Repair of ARINC Type Connectors - Table of Damage Cases

nt Date: Oct 13/08 Local Time | Page 1 of 1

RECTANGULARS CONNECTORS

X8U08481 - X0332T0 - XM20350000000001

TYPICAL DAMAGE FOUND

MODULAR TERMINAL BLOCKS

Typical damage on modular terminal blocks and other miscellaneous components.
Terminal blocks and modular terminal block damage.
In this case you must replace the electrical components with the same P/N.

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-53-54 - REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES (Airbus)	

REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES (Airbus)

REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES DESCRIPTION AND OPERATION

1. General
   This chapter gives the technical requirements of repairs for the electrical components and for the grounding modules.
2. Damage Check Procedure
   A. Electrical Components

   NOTE: If you find one of these components that is not in the correct condition, you must replace it with a component with the same P/N or with an equivalent P/N (Refer to IPC or SM):
   - Illuminated push-button switch
   - Push-button switch
   - Circuit breaker
   - Relay base and relay
   - Changeover switches (button or toggle)
   - Rotary switch
   - Limit switch
   - Terminal block
   - Modular terminal block
   - Indicator lights

   B. Grounding Module E0425
   (1) Table of damage cases
   (Ref. Fig. 001)

Figure 001.1 / Graphic SH 001.1 Repair of grounding Module

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MODULAR TERMINAL BLOCKS

X8U08481 - X0332T0 - XM20350000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-53-54 - REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES (Airbus)	

REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES (Airbus)

REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES DESCRIPTION AND OPERATION

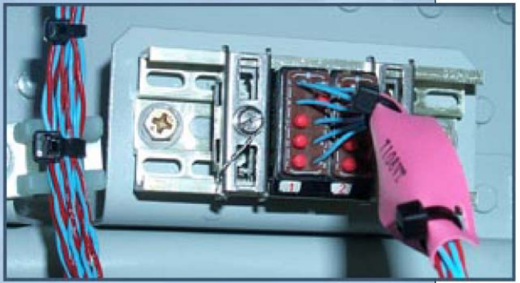
1. General
   This chapter gives the technical requirements of repairs for the electrical components and for the grounding modules.
2. Damage Check Procedure
   A. Electrical Components

   NOTE: If you find one of these components that is not in the correct condition, you must replace it with a component with the same P/N or with an equivalent P/N (Refer to IPC or SM):
   - Illuminated push-button switch
   - Push-button switch
   - Circuit breaker
   - Relay base and relay
   - Ch
   - Ro
   - Lir
   - Te
   - Mo
   - Inc

   B. Grounding M

   (1) Table of
   (Ref. Fi

Figure 001.1 / Graph



2. Damage Check Procedure

   A. Electrical Components

   NOTE: If you find one of these components that is not in the correct condition, you must replace it with a component with the same P/N or with an equivalent P/N (Refer to IPC or SM):
   - Illuminated push-button switch
   - Push-button switch
   - Circuit breaker
   - Relay base and relay
   - Changeover switches (button or toggle)
   - Rotary switch
   - Limit switch
   - Terminal block
   - Modular terminal block
   - Indicator lights

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MODULAR TERMINAL BLOCKS

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TYPICAL DAMAGE FOUND

GROUNDING MODULES

This topic will give you typical damage found on grounding modules.
The insulating body can be cracked, chipped, broken, or the attachment damaged.
The contact retention clip can be turned over, broken, or have a poor locking, and finally the seal can be damaged or lost.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-53-54 - Repair of grounding Modules - Table of Damage cases E0425

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
INSULATING BODY:	- CRACKED - CHIPPED - BROKEN - ATTACHMENT DAMAGED	REPLACE THE GROUNDING MODULE
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE GROUNDING MODULE
SEAL:	- DAMAGED - LOST	CHANGE THE SEAL

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Figure 001 (Sheet 1) / 20-53-54 - Repair of grounding Modules - Table of Damage cases E0425

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GROUNDING MODULES

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-53-54 - Repair of grounding Modules - Table of Damage cases E0425

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
INSULATING BODY:	- CRACKED - CHIPPED - BROKEN - ATTACHMENT DAMAGED	REPLACE THE GROUNDING MODULE
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE GROUNDING MODULE
SEAL:	- DAMAGED - LOST	CHANGE THE SEAL

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Figure 001 (Sheet 1) / 20-53-54 - Repair of grounding Modules - Table of Damage cases E0425

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GROUNDING MODULES

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TYPICAL DAMAGE FOUND

PRESSURE SEALS

Lastly, typical damage found on pressure seals.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 008 (Sheet 1) / 20-53-51 - Repair of Pressure Seals with Grommet - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN - BACK THREADS DAMAGED	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSE CHAPTER

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Figure 008 (Sheet 1) / 20-53-51 - Repair of Pressure Seals with Grommet - Table of Damage Cases

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PRESSURE SEALS

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PRESSURE SEALS

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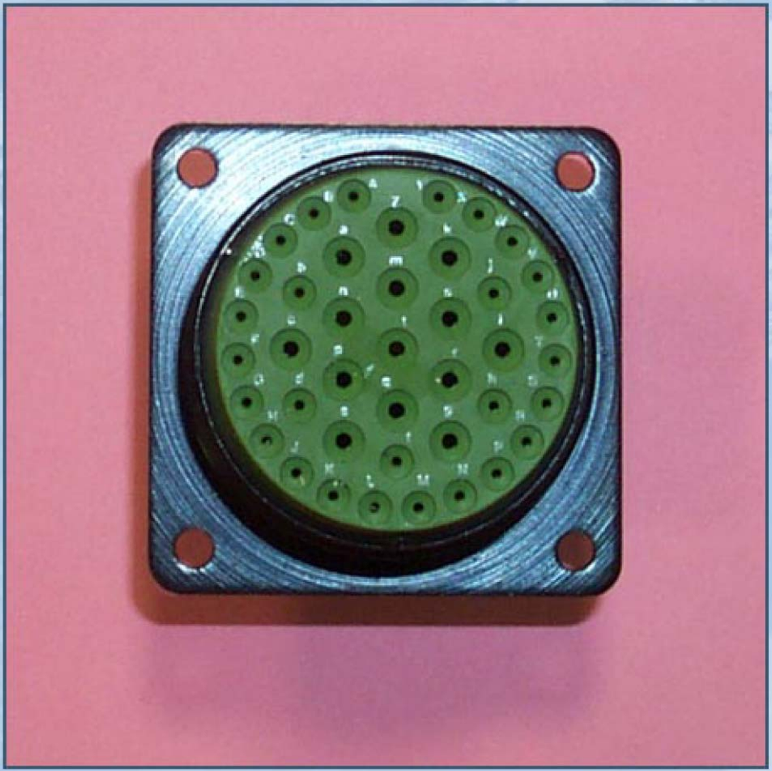
REPAIR PROCEDURES

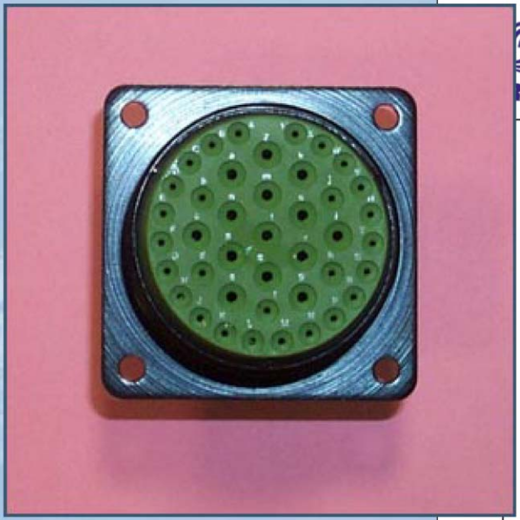
CIRCULAR CONNECTORS / BACKSHELLS

This module gives the repair procedure depending on the type of item.
Repair of circular connector.
Contact data is located in 20-48-21.
This table gives the various connectors used with this contact.
PN characteristics of the contact.
Insertion / extraction table in 20-48-21.
Equivalence table in 20-25-41.
Stripping characteristics and tools.
If needed, the tool can be visualized in chapter 20-25-12 with additional information.
Crimping procedure.
Crimping tools.
If needed, the tool can be visualized in chapter 20-25-22.
After an inspection, the Tables of Damage Cases help you to identify the right procedure to follow to perform the applicable repair.
If the backshell is damaged, an identical table gives the repair scheme.

CIRCULAR CONNECTORS / BACKSHELLS



CIRCULAR CONNECTORS / BACKSHELLS



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 008 (Sheet 1) / 20-44-11 - Type NAS1599 Connectors - Connection Table

ELEMENTS		CONNECTION PROCEDURE XREF		
P/N	TYPE	CONNECTION TYPE MISCELLANEOUS	CONNECTION P/N MISCELLANEOUS P/N	ATA REF
ABS0497 ABS0498	PLUG RECEPTACLE	BY CONTACTS	NSA938151PA2000 NSA938152SA2000	20-48-21
		BY COAXIAL CONTACTS	NSA938171PL1600 NSA938172SL1600	20-48-33
		BLANKING PLUG	NSA938153BAXXXX	20-48-41
E0039 (ex NSA938104) E0052** NSA938000 E0040 (ex NSA938105) E0041 (ex NSA938106) E0053** E0054** NSA938001 NSA938002	PLUG RECEPTACLE	BY CONTACTS	NSA938151PXXXXX NSA938152SXXXXX EN3155-018	20-48-21
		* BY C CON		
		SLE		
		DUMMY CONTACT	NSA938195PE01	20-48-21
		BLANKING PLUGS	E0616BBXXXX NSA938153BAXXXX	20-48-41
ABS0592 ABS0594 ABS0595 ABS1425 EN3646	PLUG RECEPTACLE CONNECTOR	BY CONTACTS	EN3155-018 EN3155-019	20-48-21

BY CONTACTS	NSA938151PXXXXX NSA938152SXXXXX EN3155-018 EN3155-019	20-48-21

NOTE : - " * " TO BE USED WITH COAXIAL WIRE CODE XE (RG 188A/U) INSTEAD OF THE NORMAL CONTACT SIZE 16.

- " ** " DUMMY CONTACTS ONLY FOR PLUGS MA OTHERWISE USE NORMAL CONTACTS FOR UNUSED POSITION .

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Figure 008 (Sheet 1) / 20-44-11 - Type NAS1599 Connectors - Connection Table

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CIRCULAR CONNECTORS / BACKSHELLS

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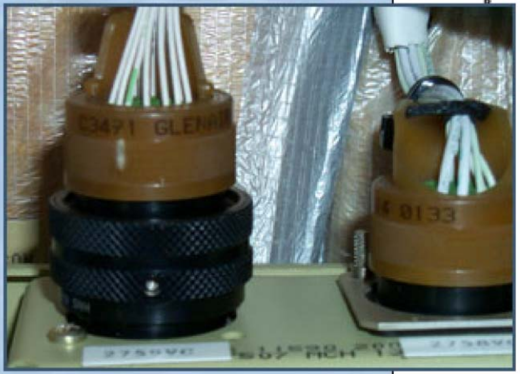
R 3. Connection Procedure for Contacts NSA938151, NSA938152, EN3155-018 and
R EN3155-019.

A. Contacts P/N and Characteristics
R (Ref. Fig. 010, 011)

CONTACTS	USE WITH PLUG	USE WITH RECEPTACLE
NSA938151 NSA938152 EN3155-018 EN3155-019	EN2997 - EN3646 ABS0364 - ABS0497 E0039 - E0052 - E0186 E0195 - E0320 - E0451 E0452 - E0579 NSA938000 SOURIAU 8915-61	EN2997 - EN3646 ABS0364 - ABS0498 E0040 - E0041 E0053 - E0054 E0187 - E0197 E0321 - E0322 E0454 - NSA938001 NSA938002
NSA938195	E0052	E0053 - E0054



B. Temperature
Minimum operatin
Maximum operatin

C. Contacts Inserti
(Ref. Fig. 012,

D. Dummy Contacts
(Ref. Fig. 014)

E. Wire Stripping

(1) Normal Wire
(Ref. Fig. 0
- If sealing
wire befor
- Select the
- Strip to t

(2) Special Wire
(Ref. Fig. 0
E0437 DL22 a
NSA935132 DJ20

R

CONTACTS	USE WITH PLUG	USE WITH RECEPTACLE
NSA938151 NSA938152 EN3155-018 EN3155-019	EN2997 - EN3646 ABS0364 - ABS0497 E0039 - E0052 - E0186 E0195 - E0320 - E0451 E0452 - E0579 NSA938000 SOURIAU 8915-61	EN2997 - EN3646 ABS0364 - ABS0498 E0040 - E0041 E0053 - E0054 E0187 - E0197 E0321 - E0322 E0454 - NSA938001 NSA938002
NSA938195	E0052	E0053 - E0054

EFF : ALL

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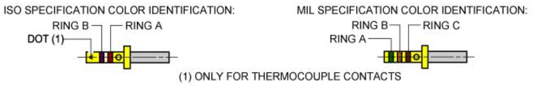
CIRCULAR CONNECTORS / BACKSHELLS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 010 (Sheet 1) / 20-48-21 - Normal Contacts - P/N Characteristics - NSA938151 and NSA938152



PIN: NSA938151PXXXXX
SOCKET: NSA938152SXXXXX

CONTACT		COLOR IDENTIFICATION				PERMITTED WIRE GAUGE
PIN	SOCKET	SPECIFICATION	RING A	RING B	RING C OR DOT	
PA2000	SA2000	ISO 8843	RED	VIOLET	–	24 TO 18
PB2000	–	MIL-C-39029/9	BROWN	ORANGE	GREEN	24 TO 20
	SB2000	ISO 8843	RED	RED	YELLOW	
–		MIL-C-39029/9	BROWN	YELLOW	BROWN	
PC2000	–	MIL-C-39029/9	BROWN	ORANGE	YELLOW	
	SC2000	ISO 8843	RED	RED	BLACK	
–		MIL-C-39029/9	BROWN	YELLOW	BLACK	
–	SA1600	MIL-C-39029/9	BROWN	BROWN	BLUE	20 TO 16
PA1600	SA1600	ISO 8843	BLUE	BLUE	–	
–	SB1600	ISO 8843	BLUE	BLUE	YELLOW	
–		MIL-C-39029/9	GREEN	RED	RED	
–	SC1600	ISO 8843	BROWN	BLUE	BLACK	
–		MIL-C-39029/9	BROWN	RED	BROWN	
PA1600	–	MIL-C-39029/9	BROWN	BROWN	BROWN	
–	SA1200	MIL-C-39029/9	BROWN	BROWN	GREY	16 TO 12
PA1200	–	MIL-C-39029/9	BROWN	BROWN	ORANGE	
	SA1200	ISO 8843	YELLOW	YELLOW	–	16 AND 12
PA1601	SA1601	ISO 8843	BLUE	ORANGE	–	18 TO 14
PA1602	SA1602	ISO 8843	BLUE	VIOLET	–	24 TO 18
–	SB1602	ISO 8843	BLUE	RED	YELLOW	24 TO 20
–	SC1602	ISO 8843	BLUE	RED	BLACK	
–	SA1202	ISO 8843	YELLOW	VIOLET	–	24 TO 18

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CIRCULAR CONNECTORS / BACKSHELLS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 006 (Sheet 1) / 20-25-42 - Contact Insertion/Extraction Tools - Miscellaneous Connection Types M81969/14 and Equivalent Tools

PLASTIC TOOL

TOOL MIL P/N	TYPE/COLOR		CONTACT SIZE	EQUIVALENT TOOLS					
	EXT	INS		CANNON	DEUTSCH	MIL / MS	NAS	RADIALL	SOURIAU
M81969/14-01	WHITE	GREEEN	22	CIET22D-01	M15570-22-1	MS27534-22D	–	–	8599-0022
M81969/14-02	WHITE	RED	20	–	M15570-20	MS27534-20 OR M83723/31-20 OR MS3447-20	–	–	8522-20
M81969/14-03	WHITE	BLUE	16	CIET16-03	M15570-16	MS27534-16 OR M83723/31-16 OR MS3447-16	1664-16	–	8522-16 8522-62 +8522-2921
M81969/14-04	WHITE	YELLOW	12	CIET12-04	M15570-12	MS27534-12 OR M83723/31-12 OR MS3447-12	1664-12	– –	8522-12
M81969/14-06	RED	–	8	–	–	–	–	282 549001	–
M81969/14-09	WHITE	BLACK	22	–	–	–	–	–	–
M81969/14-10	ORANGE	RED	20	CIET20-10	–	MS27534-20 OR M81969/14-02 OR MS3447-20	–	–	–
M81969/14-11	WHITE	RED	20	CIET20-11	M15570-20	MS27534-20 OR MS3447-20	1664-20	–	–
M81969/39-01	WHITE	GREEN	22	CIET20HD	–	MS18278-1	–	–	–

NOTE: DIFFERENT GEOMETRY IN RELATION TO SUPPLIERS

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CIRCULAR CONNECTORS / BACKSHELLS

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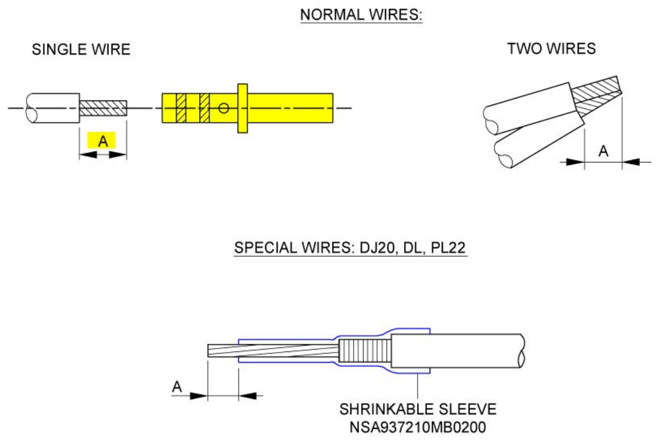

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 017 (Sheet 1) / 20-48-21 - Normal Contacts - Cable Stripping and Tools - NSA938151, NSA938152, EN3155-018 and EN3155-019

CONTACT SIZE	WIRE GAUGE	STRIPPING TOOL			
		LENGTH "A" mm (in.)	NORM	P/N	COLOR
20	2 X 24	4.8 (0.189 in.)	STRIPMASTER	45-2020-1	BLUE
	26 TO 18	4.5 (0.177 in.)			
16	24 TO 16	7 (0.275 in.)			
	14			45-1939-1	RED
12	24 TO 18			45-2020-1	BLUE
	14 TO 12			45-1939-1	RED

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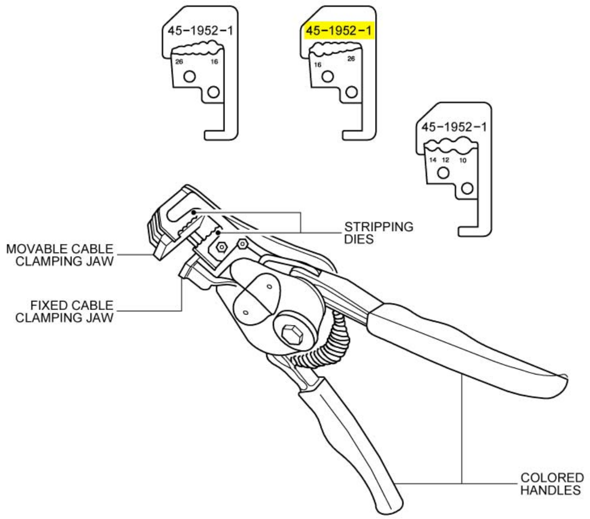
CIRCULAR CONNECTORS / BACKSHELLS

X8U08481 - X0332T0 - XM2036000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-25-12 - Stripping Tools - STRIPMASTER Tool or Equivalent	



NOTE: WHEN IT IS NECESSARY TO CHANGE THE DIES, YOU MUST ALWAYS CHANGE THE TWO PARTS. AFTER YOU CHANGE THE DIES, SAMPLES MUST BE MADE AND EXAMINED.

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Figure 002 (Sheet 1) / 20-25-12 - Stripping Tools - STRIPMASTER Tool or Equivalent

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CIRCULAR CONNECTORS / BACKSHELLS

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- Remove the fiberglass braid then the PTFE envelope over a length of 50 mm (1.9685 in.).

- Strip the core cable over a length of 35 mm (1.3779 in.).

- Install the heat shrinkable sleeve NSA937210MB0200 in order to cover the outer sheath over 10 mm (0.3937 in.) and shrink.

- Strip to the length "A".

(3) Coaxial Wire (Only for A310/A300-600)
(Ref. Fig. 018)
E0291 SW
These wire are used on the fuel system circuits.

- Strip the wire at the dimensions A and B.

- Install the heat shrinkable sleeve and shrink.

- If a shield repair is necessary:
  - Strip the braid at a distance of 100 mm (3.9370 in.) on a length of 8 mm (0.3149 in.).
  - Cut a wire gauge 24 on a length that permits to make a loop.
  - Put the solder sleeve and the shield termination wire on the coaxial wire and shrink.

F. Crimping Procedure

F. Crimping Procedure

(Ref. Fig. 019, 020, 021)

- Engage the stripped wire into the contact.

- Make sure that you can see the wire conductor through the contact hole.
- Select the applicable tool.

- Install the contact in the positioner.

- Fully close the tool handles until the safety ratchet releases.

- Remove the crimped contact.

EFF : ALL

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CIRCULAR CONNECTORS / BACKSHELLS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 019 (Sheet 1) / 20-48-21 - Normal Contacts - Crimping Tools - NSA938151 and NSA938152

PIN: NSA938151PXXXXX
SOCKET: NSA938152SXXXXX

CONTACT	WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
PA2000 SA2000 PB2000 SB2000 PC2000 SC2000	2 x 24						
	24						
	22						
	20						
	18 (*)						
PA1600 SA1600 SB1600 SC1600	20						
	18						
	16	MIL					
PA1601 SA1601 SB1601 SC1601	18						
	16						
	14		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
PA1602 SA1602 SB1602 SC1602	24		22520/1-01		22520/1-02	BLUE	2
			22520/7-01		22520/7-03	-	4
	22		22520/1-01		22520/1-02	BLUE	3
			22520/7-01		22520/7-03	-	5
	20		22520/1-01		22520/1-02	BLUE	4
			22520/7-01		22520/7-03	-	6
	18 (*)		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	7
PA1200 SA1200	16		22520/1-01		22520/1-02	YELLOW	6
	14						7
	12						8
SA1202	24		22520/1-01		22520/1-02	YELLOW	2
	22						3
	20						4
	18						5

(*) ONLY FOR CONTACTS NSA938151PAXXXX OR NSA938152SAXXXX

PIN: NSA938151PXXXXX
SOCKET: NSA938152SXXXXX

CONTACT	WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
PA2000 SA2000 PB2000 SB2000	2 x 24		22520/2-01		22520/2-02	-	6
			22520/7-01		22520/7-02		5
	24		22520/1-01		22520/1-02	-	2
			22520/2-01		22520/2-02		5
			22520/7-01		22520/7-02		4
	22		22520/1-01		22520/1-02	-	3
			22520/2-01		22520/2-02		6
			22520/7-01		22520/7-02		5

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Figure 019 (Sheet 1) / 20-48-21 - Normal Contacts - Crimping Tools - NSA938151 and NSA938152

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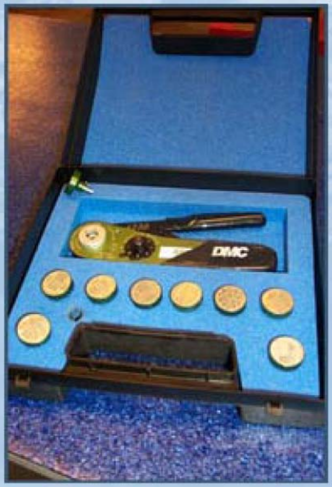
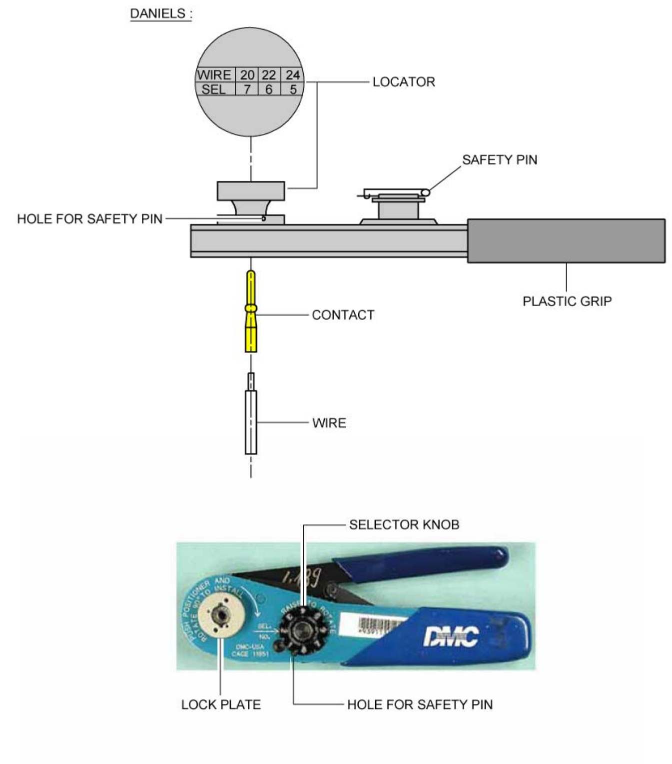
CIRCULAR CONNECTORS / BACKSHELLS



Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-25-22 - Hand Crimping Tool M22520/2-01 and M22520/7-01	



NOTE: DIFFERENT GEOMETRY DEPENDING ON SUPPLIER

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Figure 002 (Sheet 1) / 20-25-22 - Hand Crimping Tool M22520/2-01 and M22520/7-01

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CIRCULAR CONNECTORS / BACKSHELLS

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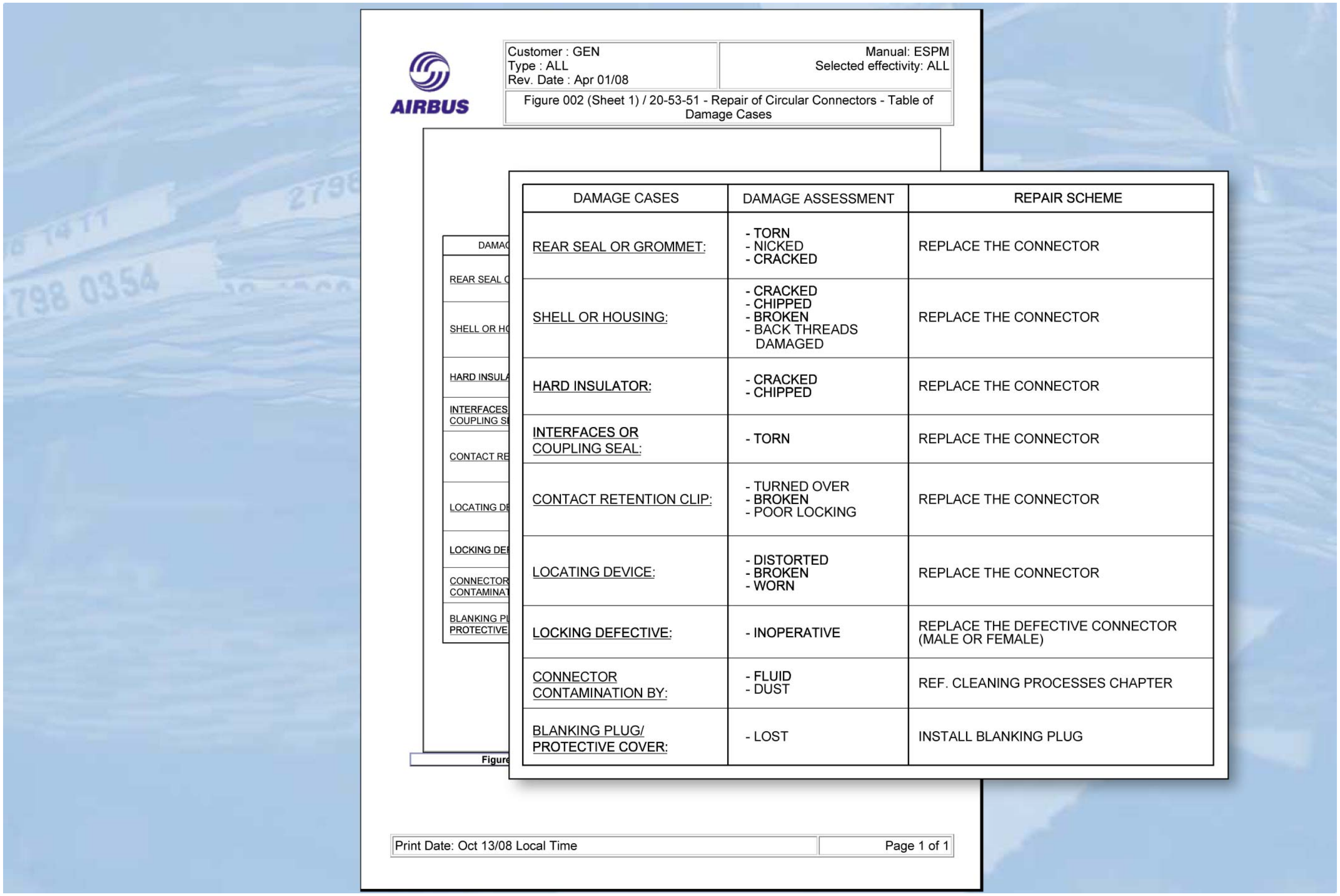

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN - BACK THREADS DAMAGED	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE CONNECTOR
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE CONNECTOR
LOCKING DEFECTIVE:	- INOPERATIVE	REPLACE THE DEFECTIVE CONNECTOR (MALE OR FEMALE)
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
BLANKING PLUG/ PROTECTIVE COVER:	- LOST	INSTALL BLANKING PLUG

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CIRCULAR CONNECTORS / BACKSHELLS

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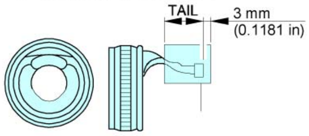
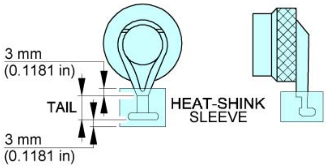
Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-53-45 - Repair of Backshells for Circular Connectors, Convoluted and Screened Conduits Table of Damage Cases	

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
CABLE TIE NSA935401:	- LOST	INSTALL NSA935401 OR TIE NSA8420
THREADS:	- DAMAGED	REPLACE BACKSHELL
BACKSHELL "TAIL":	- BROKEN	REPLACE BACKSHELL
PAD NSA935404:	- LOST	- REPLACE PAD NSA935404 AND INSTALL CABLE TIE NSA935401 OR NSA8420 - IF NOT AVAIBLE: INSTALL SHRINK SLEEVE ABS0836 ON THE BACKSHELLL "TAIL" AND INSTALL CABLE TIE NSA935401 EXAMPLE: E0080 1 - STRAIGHT BACKSHELL:  **NOTE:** YOU MUST ENGAGE THE SLEEVE FULLY ON THE BACKSHELL TAIL WITH 3mm (0.1181 in) MORE LENGHT AT THE REAR. 2 - ELBOW BACKSHELL:  **NOTE:** YOU MUST INSTALL THE SLEEVE ON THE BACKSHELL TAIL WITH 3 mm (MINIMUM) (0.1181 in) AT THE FRONT AND 3 mm (0.1181 in) AT THE REAR OF THE STRAIGHT PART (V-SECTION).

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CIRCULAR CONNECTORS / BACKSHELLS

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REPAIR PROCEDURES

RECTANGULAR CONNECTORS AND ARINC TYPE CONNECTORS

Repair of rectangular connectors - Layout.
Repair of rectangular connectors - Table of damage cases.
Repair of ARINC type connectors - Layout.
Repair of ARINC type connectors - Table of damage cases.

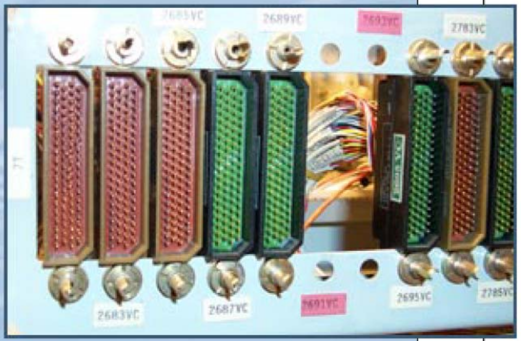

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Figure 003 (Sheet 1) / 20-53-51 - Repair of Rectangular Connectors - Layout	

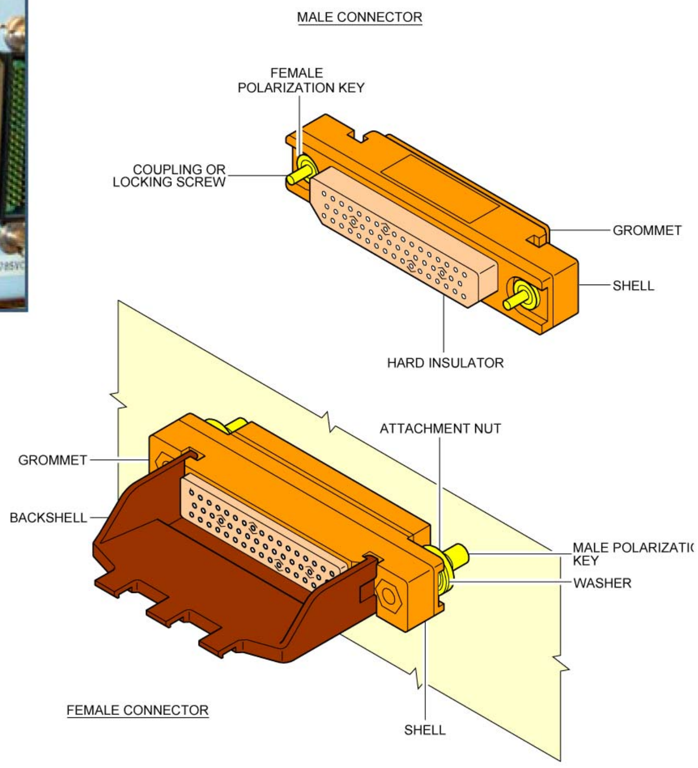

Figure 003 (Sheet 1) / 20-53-51 - Repair of Rectangular Connectors - Layout

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RECTANGULAR CONNECTORS AND ARINC TYPE CONNECTORS

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-53-51 - Repair of Rectangular Connectors - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE CONNECTOR
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE POLARIZATION KEYS
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
BLANKING PLUG/ PROTECTIVE COVER:	- LOST	INSTALL BLANKING PLUG/ PROTECTIVE COVER
LOCKING DEFECTIVE:		REPLACE LOCKING SCREW

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Figure 004 (Sheet 1) / 20-53-51 - Repair of Rectangular Connectors - Table of Damage Cases

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RECTANGULAR CONNECTORS AND ARINC TYPE CONNECTORS

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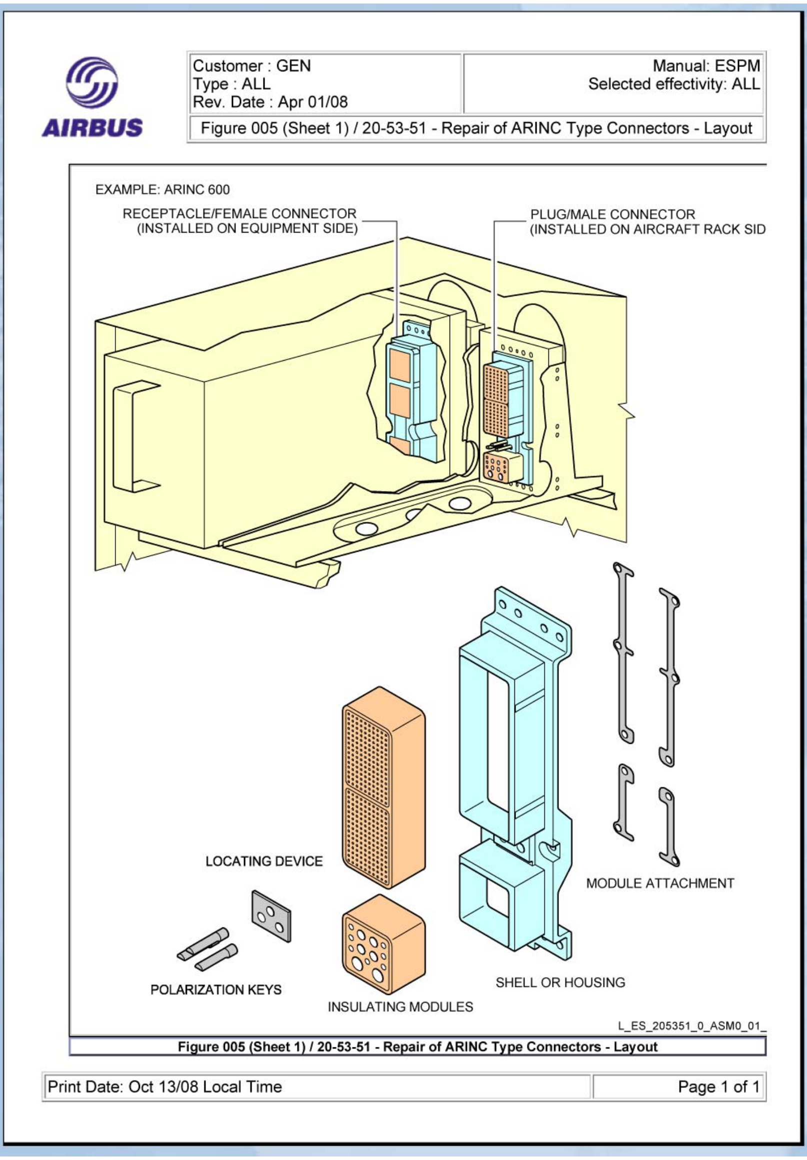

RECTANGULAR CONNECTORS AND ARINC TYPE CONNECTORS

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 006 (Sheet 1) / 20-53-51 - Repair of ARINC Type Connectors - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE MODULE (KEEP THE SAME MANUFACTURER)
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE MODULE (KEEP THE SAME MANUFACTURER)
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE LOCATING DEVICE OR POLARIZATION KEYS
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
LOCKING DEFECTIVE:	- INOPERATIVE	REPLACE LOCKING SYSTEM

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Figure 006 (Sheet 1) / 20-53-51 - Repair of ARINC Type Connectors - Table of Damage Cases

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RECTANGULAR CONNECTORS AND ARINC TYPE CONNECTORS

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REPAIR PROCEDURES

MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

A modular terminal block could consist of: the stud unit,
the cover,
the module identification,
the false module,
the shunt spacer,
the barrier,
the junction module,
the end plate,
the rail,
the end clamp,
the end clamp cover attachment,
the shunt.
For all this items, there is no possible repair.
They consequently have to be replaced when damage occurs.
However each part of an entire modular terminal block can be individually replaced.
Repair of non-modular terminal blocks: connection table.
After replacing a non-repairable item, apply the right torque value as shown in the table.
Put the torque wrench at right angle to the torquing axis.
Put your hand in the middle of the handle.
Gradually pull at right angle to the torque wrench.
Immediately stop torquing when the wrench "clicks".
Then, make an identification mark on the screw as shown in the figure.
Note: The mark indicates that the screw has been torqued and, during a visual inspection, it ensures that the screw is still torqued if the mark is in a straight line.

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO.
- TYPE CODE
- STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
			...ST FIT ...THE CENTER ...HE ENDS
			...DE FIT: ...AT THE ENDS
			...TALLATION
			...ALLATION
			...R OF HOLES

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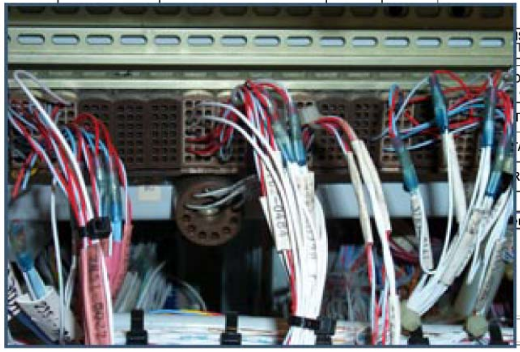
...ntification NSA937901



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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

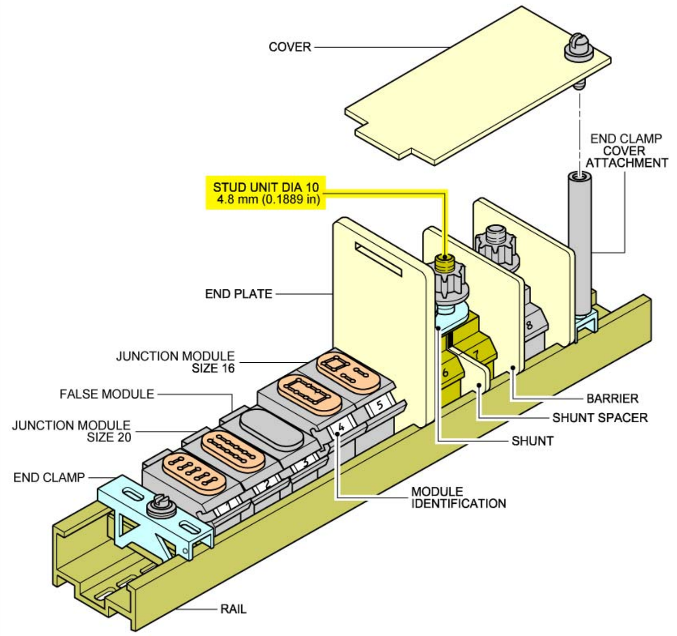

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Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO. (0085)
- TYPE CODE (R)
- STANDARD P/N (NSA937901)

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

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AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

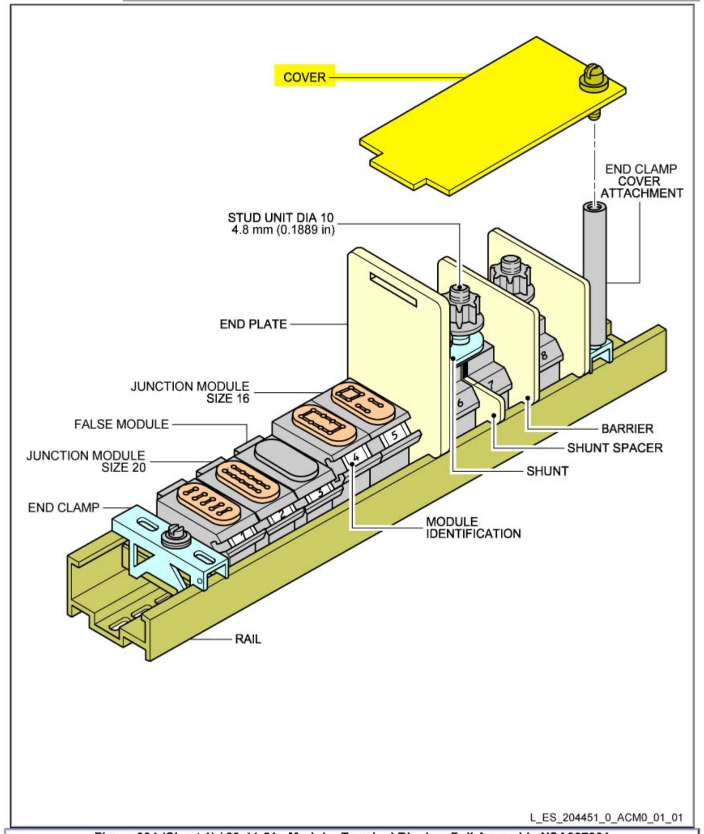

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

X8U08481 - X0332T0 - XM20360000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO. (0085)
- TYPE CODE (R)
- STANDARD P/N (NSA937901)

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

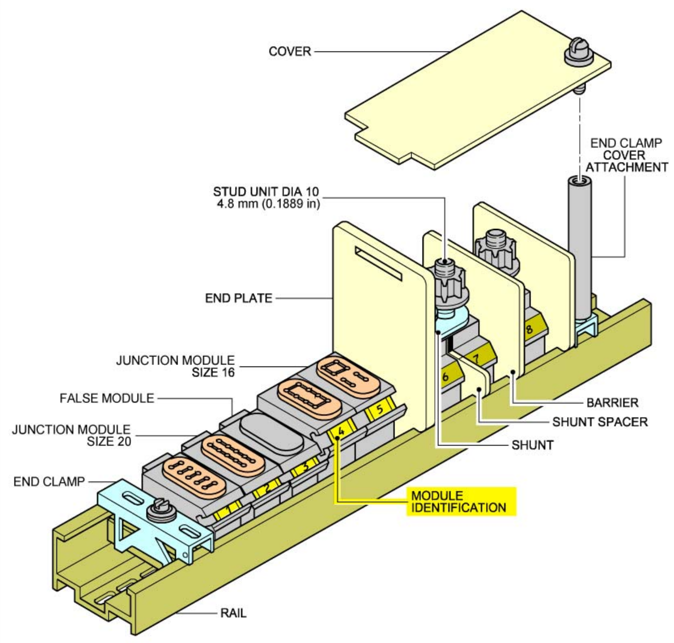

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Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- 0085: ITEM NO.
- R: TYPE CODE
- NSA937901: STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

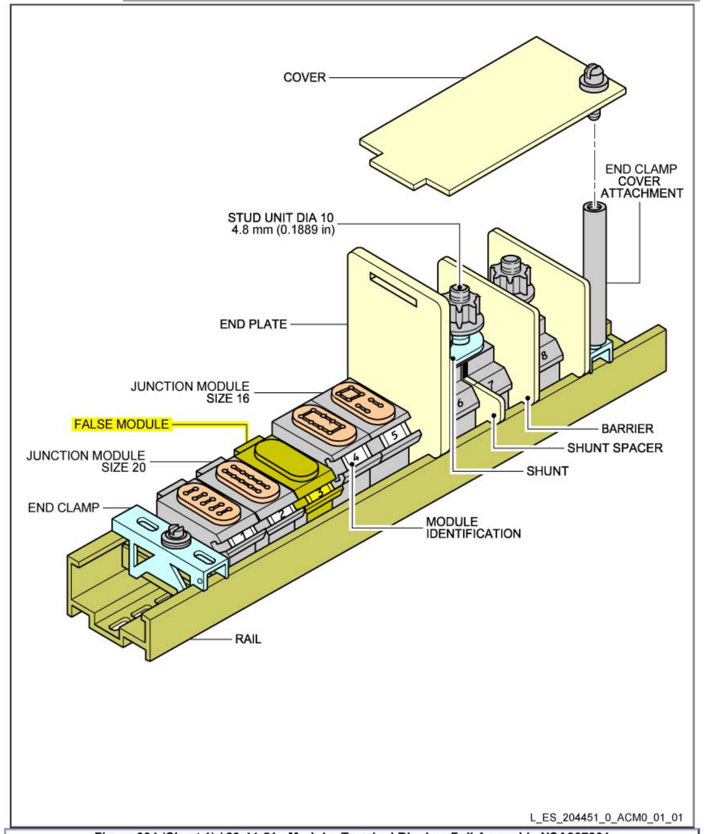

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO.
- TYPE CODE
- STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

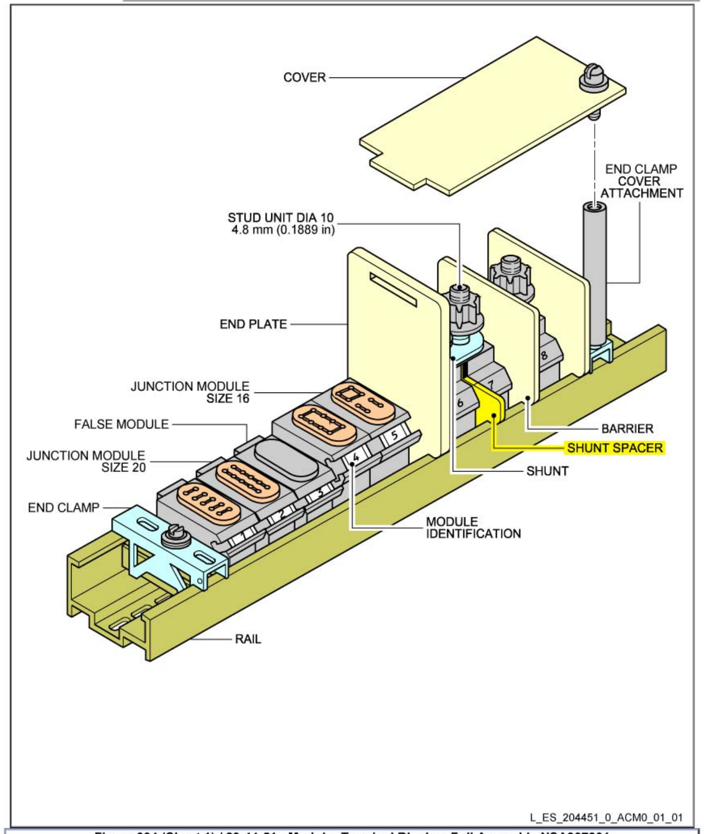

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Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

X8U08481 - X0332T0 - XM203600000001

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO.
- TYPE CODE
- STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

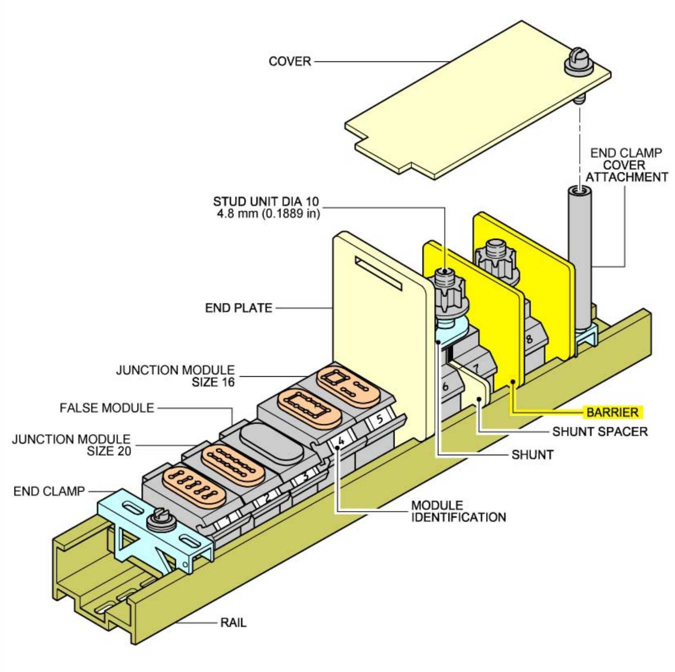

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

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Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO. (0085)
- TYPE CODE (R)
- STANDARD P/N (NSA937901)

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

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AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

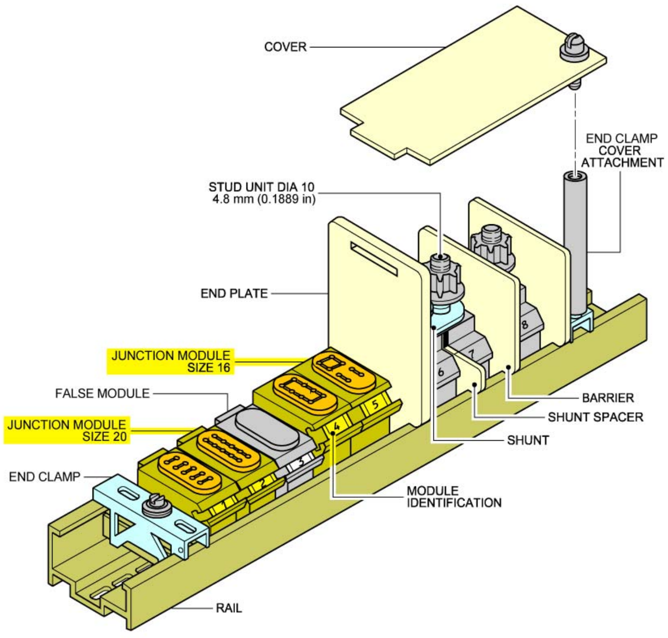

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

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X8U08481 - X0332T0 - XM2036000000001

MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

AIRBUS

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO.
- TYPE CODE
- STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

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AIRBUS

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

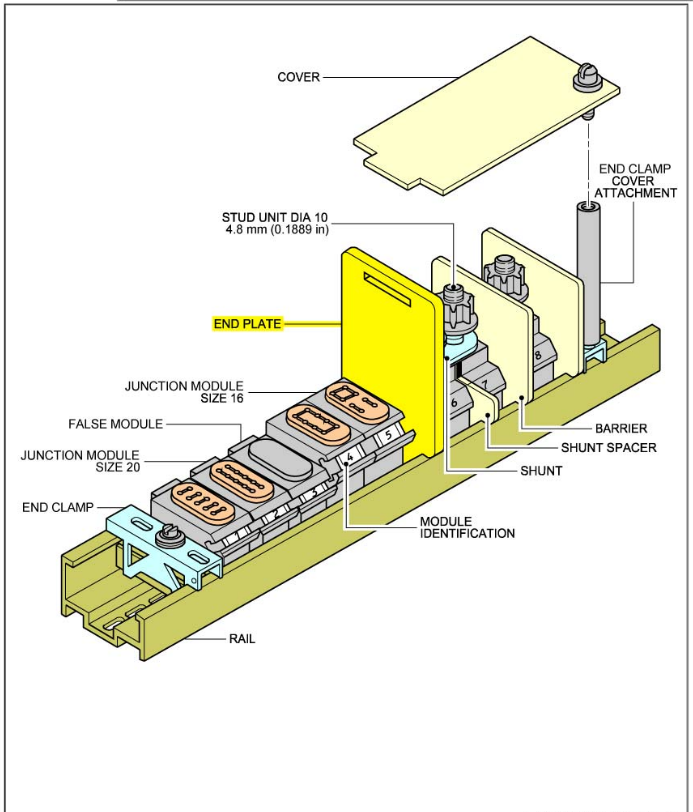

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Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

AIRBUS

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO.
- TYPE CODE
- STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

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AIRBUS

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

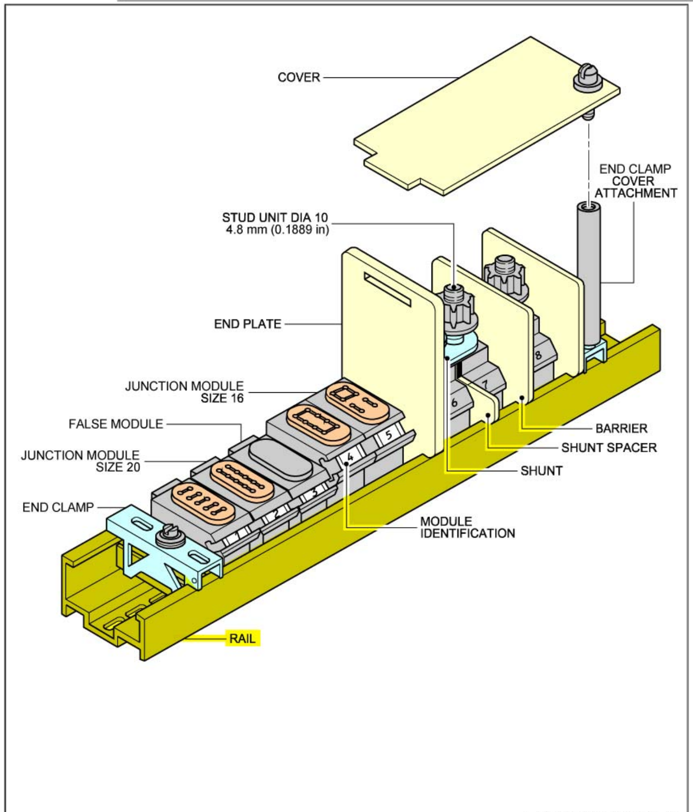

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Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

Print Date: Oct 13/08 Local Time | Page 1 of 1

X8U08481 - X0332T0 - XM20360000000001

MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901	

EG: NSA937901 R 0085
- ITEM NO. (0085)
- TYPE CODE (R)
- STANDARD P/N (NSA937901)

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

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Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

Print Date: Oct 13/08 Local Time	Page 1 of 1

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901	

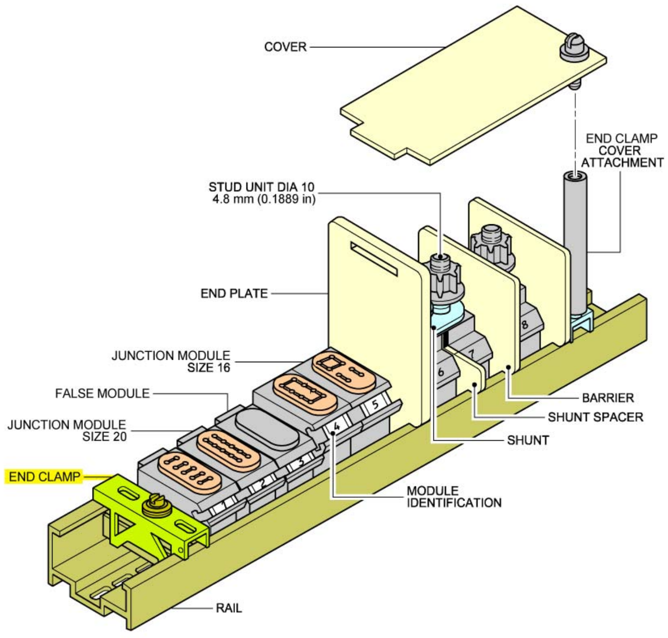

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

Print Date: Oct 13/08 Local Time	Page 1 of 1

MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

X8U08481 - X0332T0 - XM203600000001

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085
- ITEM NO.
- TYPE CODE
- STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

L_ES_204451_0_AAM0_01_02

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

Print Date: Oct 13/08 Local Time | Page 1 of 1

Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

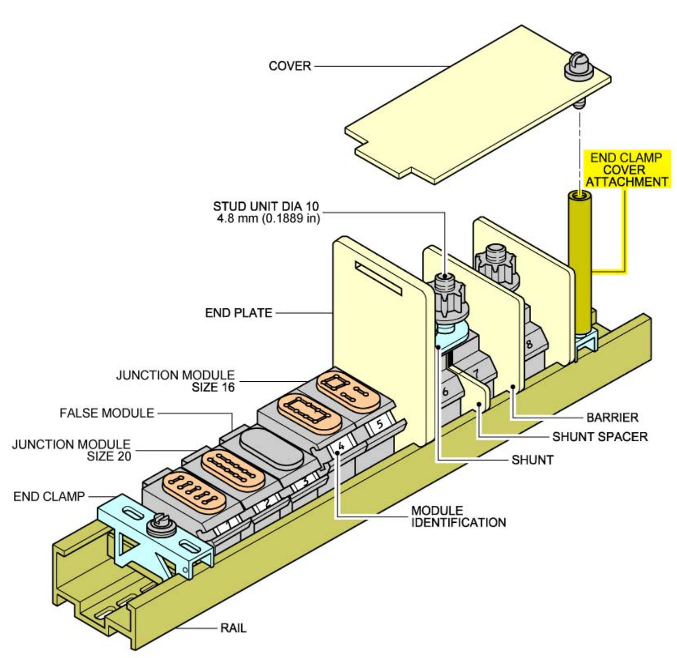

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Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

Print Date: Oct 13/08 Local Time | Page 1 of 1

MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

X8U08481 - X0332T0 - XM2036000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

EG: NSA937901 R 0085

- 0085 — ITEM NO.
- R — TYPE CODE
- NSA937901 — STANDARD P/N

ELEMENT	TYPE CODE	ITEM NO.	ITEM DEFINITION
STUD UNIT	B	-	-
COVER	C	01	NUMBER OF TERMINALS 01 TO 05
	CA	06	NUMBER OF TERMINALS 06 TO 15
MODULE IDENTIFICATION	E	XX OR X	IDENTIFICATION FIGURE 0 TO 99 VARIANT A 0 TO 9 VARIANT B
FALSE MODULE	FM	-	-
SHUNT SPACER	IN	-	-
BARRIER	IS	-	-
JUNCTION MODULE	M	20-01	20,22: CONTACT SIZE M => 22,20,16,12 MA => 22,20 MB,MC => 22 01: CONTACT ARRANGEMENT CODE
	MA	20-01	
	MB	22-01	
	MC	22-01	
END PLATE	P	-	-
RAIL	R	XXXX	LENGTH IN mm
	RA	XXXX	
	RB	XXXX	
END CLAMP	S	-	TWIST FIT USED AT THE CENTER OR THE ENDS
	S1	-	SLIDE FIT: USED ONLY AT THE ENDS
END CLAMP COVER ATTACHMENT	SC	-	RH INSTALLATION
	SD	-	LH INSTALLATION
SHUNT	SH	5	NUMBER OF HOLES

L_ES_204451_0_AAM0_01_02

Figure 003 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - P/N Identification NSA937901

Print Date: Oct 13/08 Local Time | Page 1 of 1

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

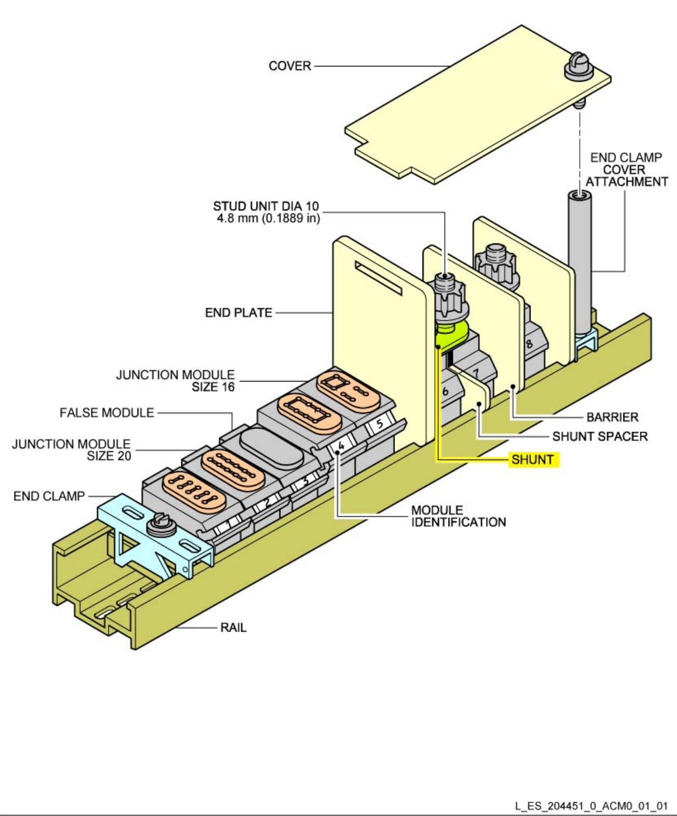
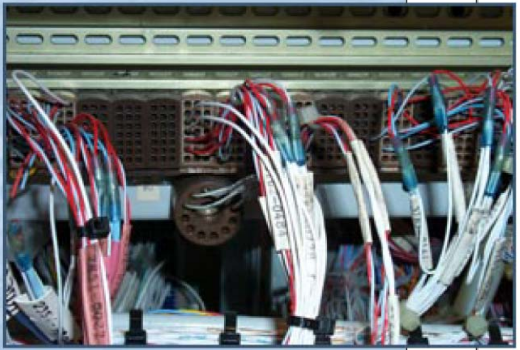


Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

Print Date: Oct 13/08 Local Time | Page 1 of 1

MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

X8U08481 - X0332T0 - XM2036000000001



AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

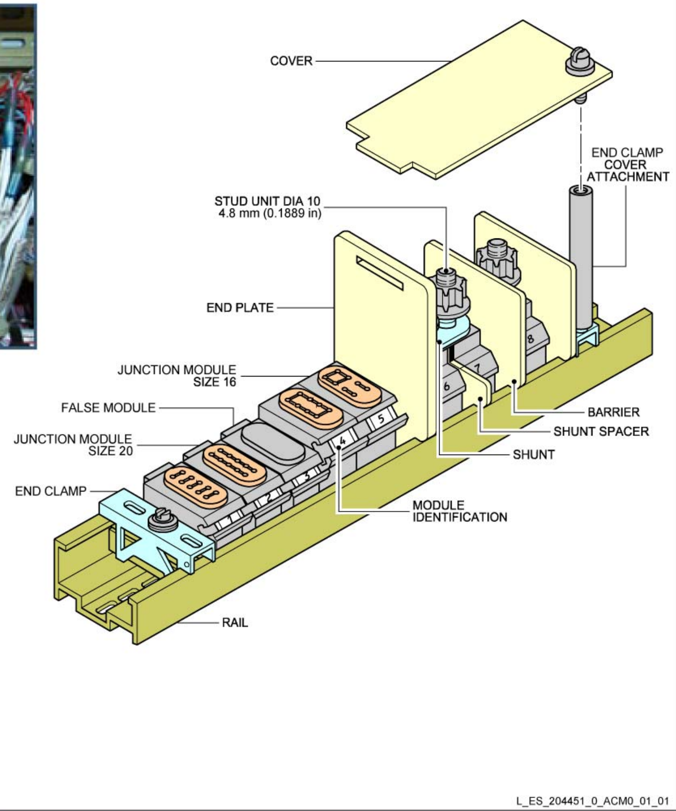
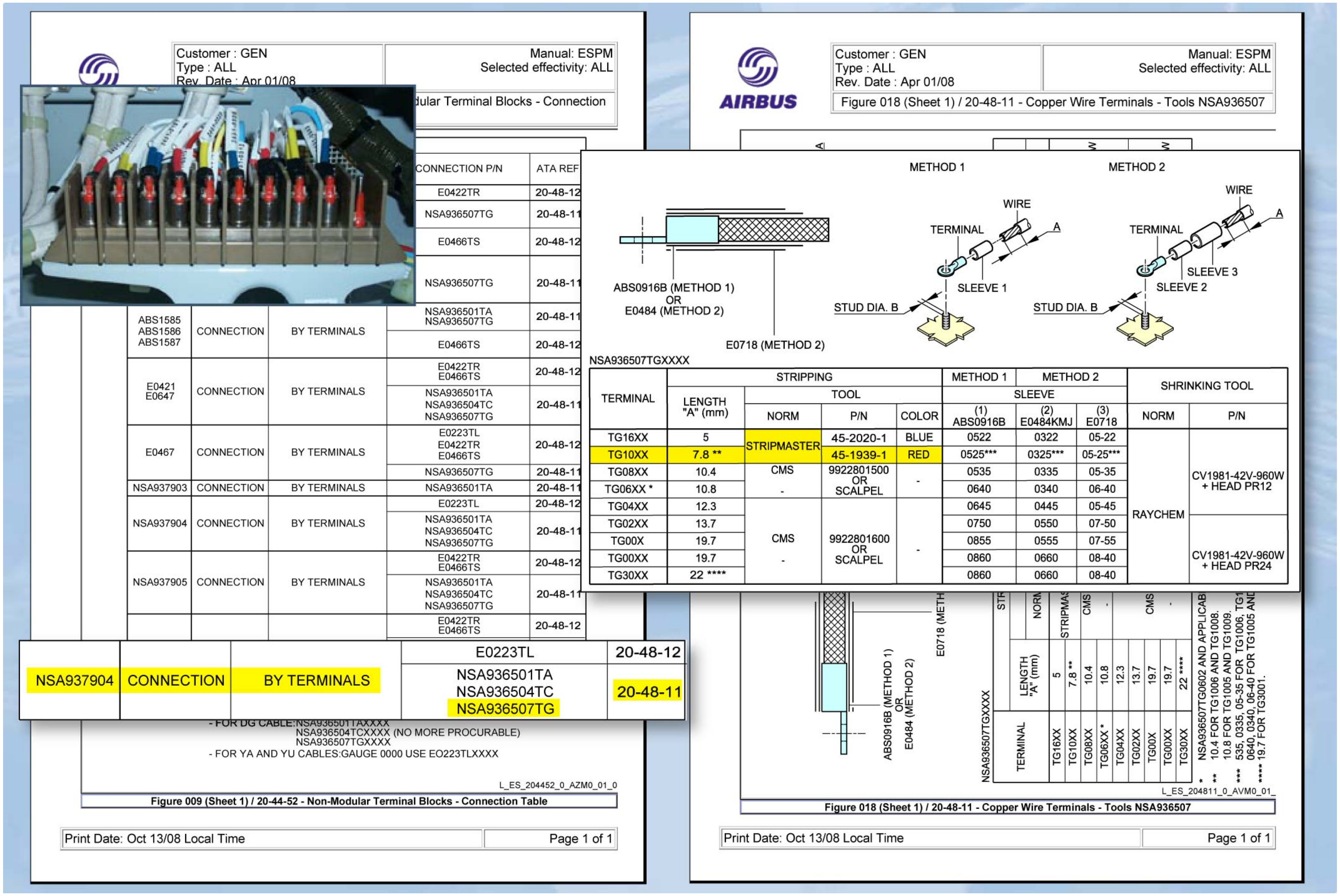


Figure 004 (Sheet 1) / 20-44-51 - Modular Terminal Blocks - Full Assembly NSA937901

Print Date: Oct 13/08 Local Time	Page 1 of 1

MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

X8U08481 - X0332T0 - XM20360000000001



Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

...dular Terminal Blocks - Connection

			CONNECTION P/N	ATA REF
			E0422TR	20-48-12
			NSA936507TG	20-48-11
			E0466TS	20-48-12
			NSA936507TG	20-48-11
ABS1585 ABS1586 ABS1587	CONNECTION	BY TERMINALS	NSA936501TA NSA936507TG	20-48-11
			E0466TS	20-48-12
E0421 E0647	CONNECTION	BY TERMINALS	E0422TR E0466TS	20-48-12
			NSA936501TA NSA936504TC NSA936507TG	20-48-11
E0467	CONNECTION	BY TERMINALS	E0223TL E0422TR E0466TS	20-48-12
			NSA936507TG	20-48-11
NSA937903	CONNECTION	BY TERMINALS	NSA936501TA	20-48-11
NSA937904	CONNECTION	BY TERMINALS	E0223TL	20-48-12
			NSA936501TA NSA936504TC NSA936507TG	20-48-11
NSA937905	CONNECTION	BY TERMINALS	E0422TR E0466TS	20-48-12
			NSA936501TA NSA936504TC NSA936507TG	20-48-11
			E0422TR E0466TS	20-48-12

NSA937904	CONNECTION	BY TERMINALS	E0223TL	20-48-12
			NSA936501TA NSA936504TC NSA936507TG	20-48-11

- FOR DG CABLE:NSA936501TAXXXX
NSA936504TCXXXX (NO MORE PROCURABLE)
NSA936507TGXXXX
- FOR YA AND YU CABLES:GAUGE 0000 USE EO223TLXXXX

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Figure 009 (Sheet 1) / 20-44-52 - Non-Modular Terminal Blocks - Connection Table

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Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 018 (Sheet 1) / 20-48-11 - Copper Wire Terminals - Tools NSA936507

NSA936507TGXXXX

TERMINAL	STRIPPING				METHOD 1	METHOD 2		SHRINKING TOOL	
	LENGTH "A" (mm)	TOOL			SLEEVE				
		NORM	P/N	COLOR	(1) ABS0916B	(2) E0484KMJ	(3) E0718	NORM	P/N
TG16XX	5	STRIPMASTER	45-2020-1	BLUE	0522	0322	05-22	RAYCHEM	CV1981-42V-960W + HEAD PR12
TG10XX	7.8 **		45-1939-1	RED	0525***	0325***	05-25***		
TG08XX	10.4	CMS	9922801500 OR SCALPEL	-	0535	0335	05-35		
TG06XX *	10.8	-			0640	0340	06-40		
TG04XX	12.3	CMS	9922801600 OR SCALPEL	-	0645	0445	05-45		
TG02XX	13.7				0750	0550	07-50		CV1981-42V-960W + HEAD PR24
TG00X	19.7				0855	0555	07-55		
TG00XX	19.7	-			0860	0660	08-40		
TG30XX	22 ****				0860	0660	08-40		

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Figure 018 (Sheet 1) / 20-48-11 - Copper Wire Terminals - Tools NSA936507

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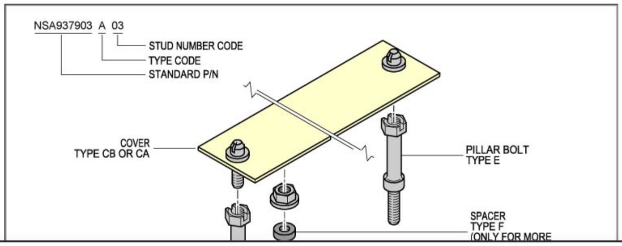
MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-44-52 - 1380 - 32 UNC Type Terminal Blocks - Full Assembly NSA937903	



TORQUE VALUE					
CONNECTION		ATTACHMENT		COVER SCREW	
MIN.	MAX.	MIN.	MAX.	MIN.	MAX
0.14 m.daN (12.39 lbf in)	0.16 m.daN (14.15 lbf in)	0.14 m.daN (12.39 lbf in)	0.16 m.daN (14.15 lbf in)	0.08 m.daN (7.07 lbf in)	0.10 m.daN (8.84 lbf in)

NSA937903

TORQUE VALUE					
CONNECTION		ATTACHMENT		COVER SCREW	
MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0.30 m.daN (26.54 lbf in)	0.35 m.daN (30.97 lbf in)	0.25 m.daN (22.13 lbf in)	0.30 m.daN (26.54 lbf in)	0.08 m.daN (7.07 lbf in)	0.10 m.daN (8.84 lbf in)

NSA937905 and NSA937906

COVER SCREW	
MIN.	MAX
0.08 m.daN (7.07 lbf in)	0.10 m.daN (8.84 lbf in)

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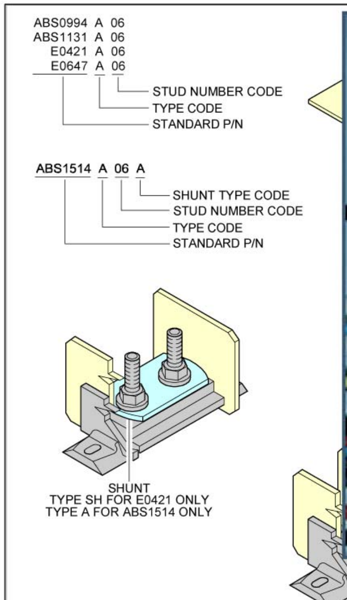
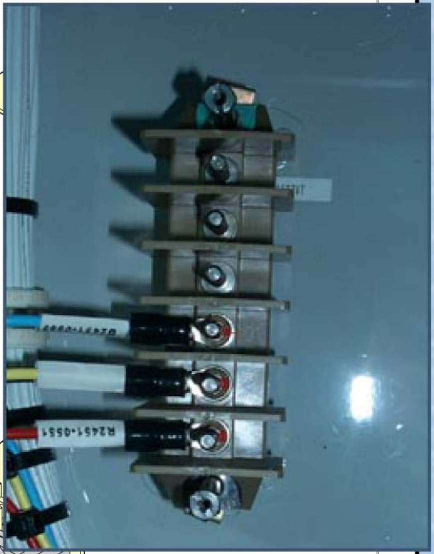
Full Assembly NSA937903

Page 1 of 1

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 002 (Sheet 1) / 20-44-52 - 1900 - 32 UNF Type Terminal Blocks - Full Assembly NSA937905 and NSA937906	





TORQUE VALUE FOR E0421, E0647, ABS0994, ABS1131 AND ABS1514					
CONNECTION		ATTACHMENT		COVER SCREW	
MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0.60 m.daN (53.10 lbf in)	0.70 m.daN (61.95 lbf in)	0.14 m.daN (12.39 lbf in)	0.16 m.daN (14.16 lbf in)	0.08 m.daN (7.08 lbf in)	0.10 m.daN (8.85 lbf in)

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-51-50 - Torquing Procedure - Typical Procedure	

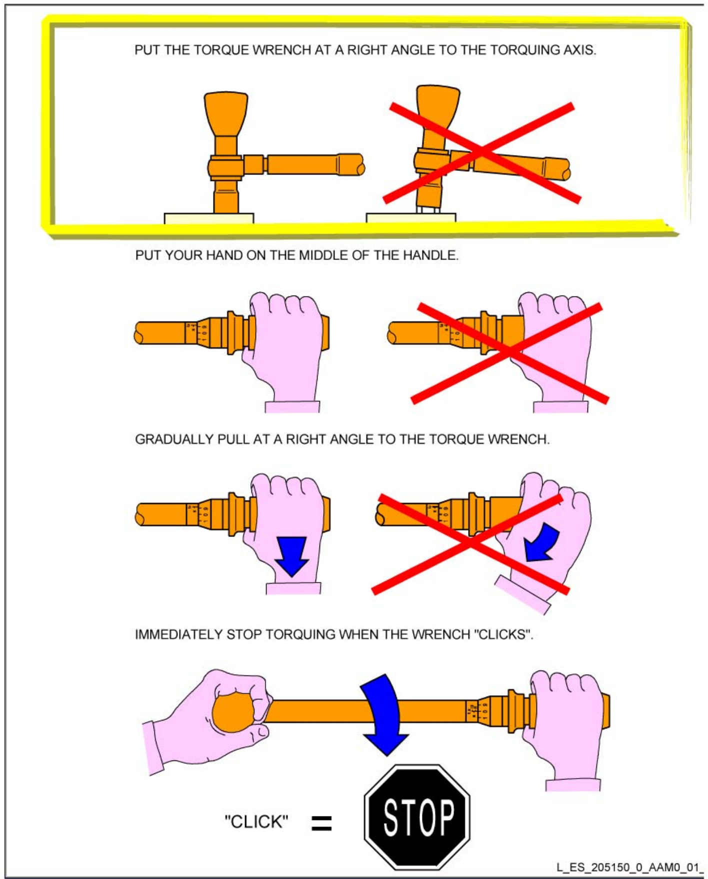

Figure 001 (Sheet 1) / 20-51-50 - Torquing Procedure - Typical Procedure

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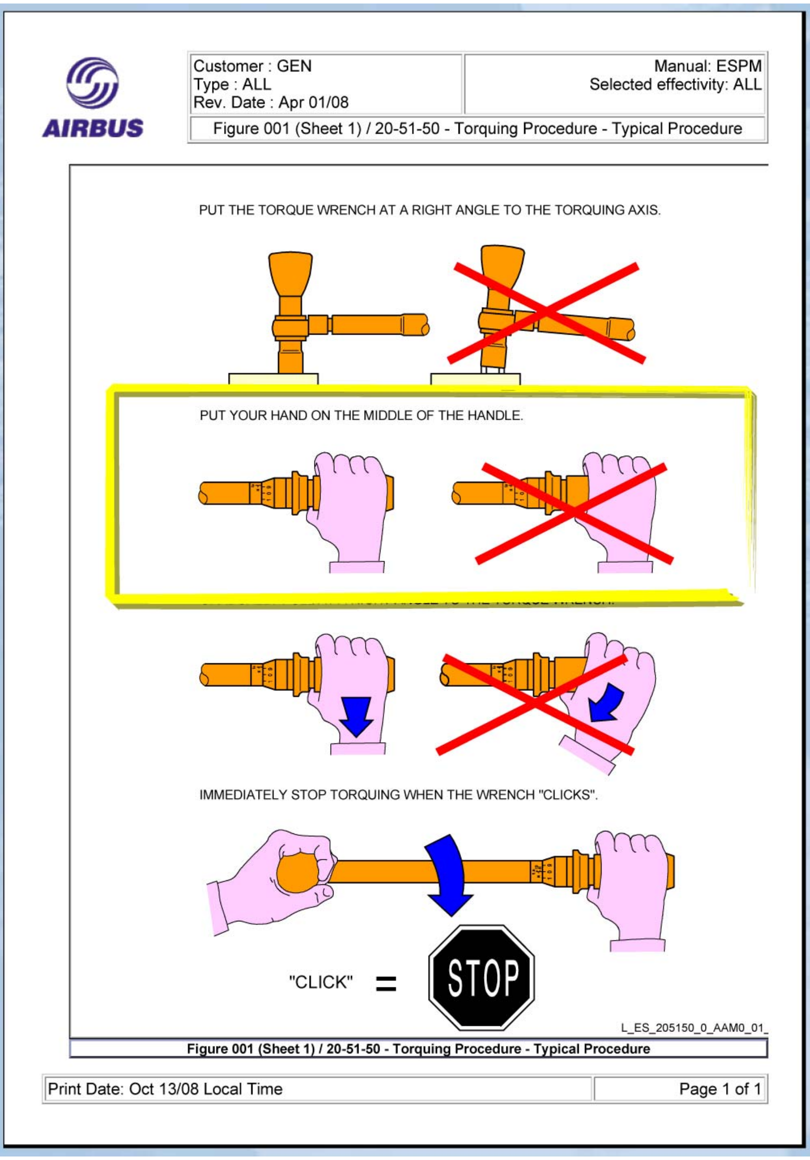
MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE


Customer : GEN
Type : ALL
Rev. Date : Apr 01/08

Manual: ESPM
Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-51-50 - Torquing Procedure - Typical Procedure

Figure 001 (Sheet 1) / 20-51-50 - Torquing Procedure - Typical Procedure

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MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

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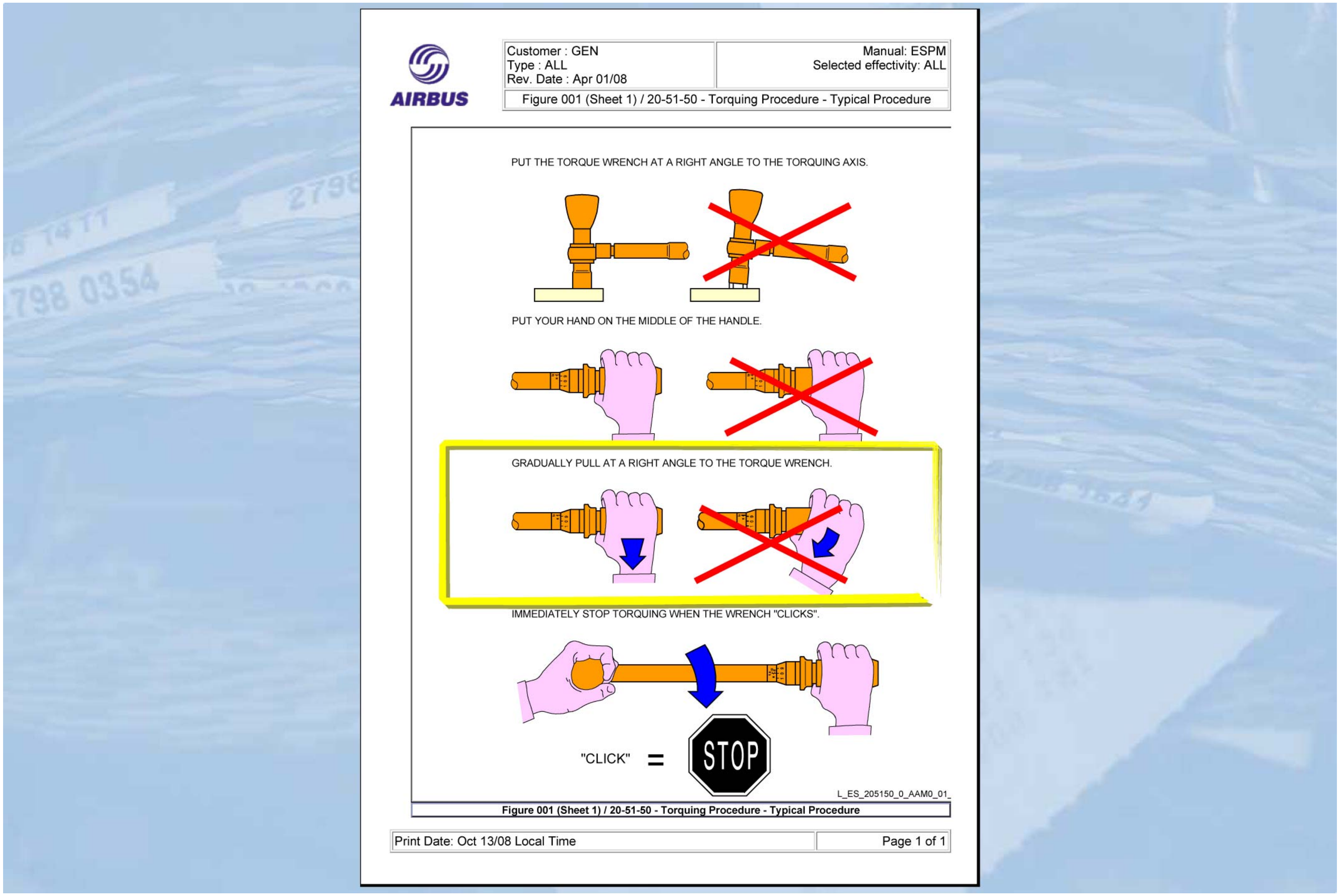
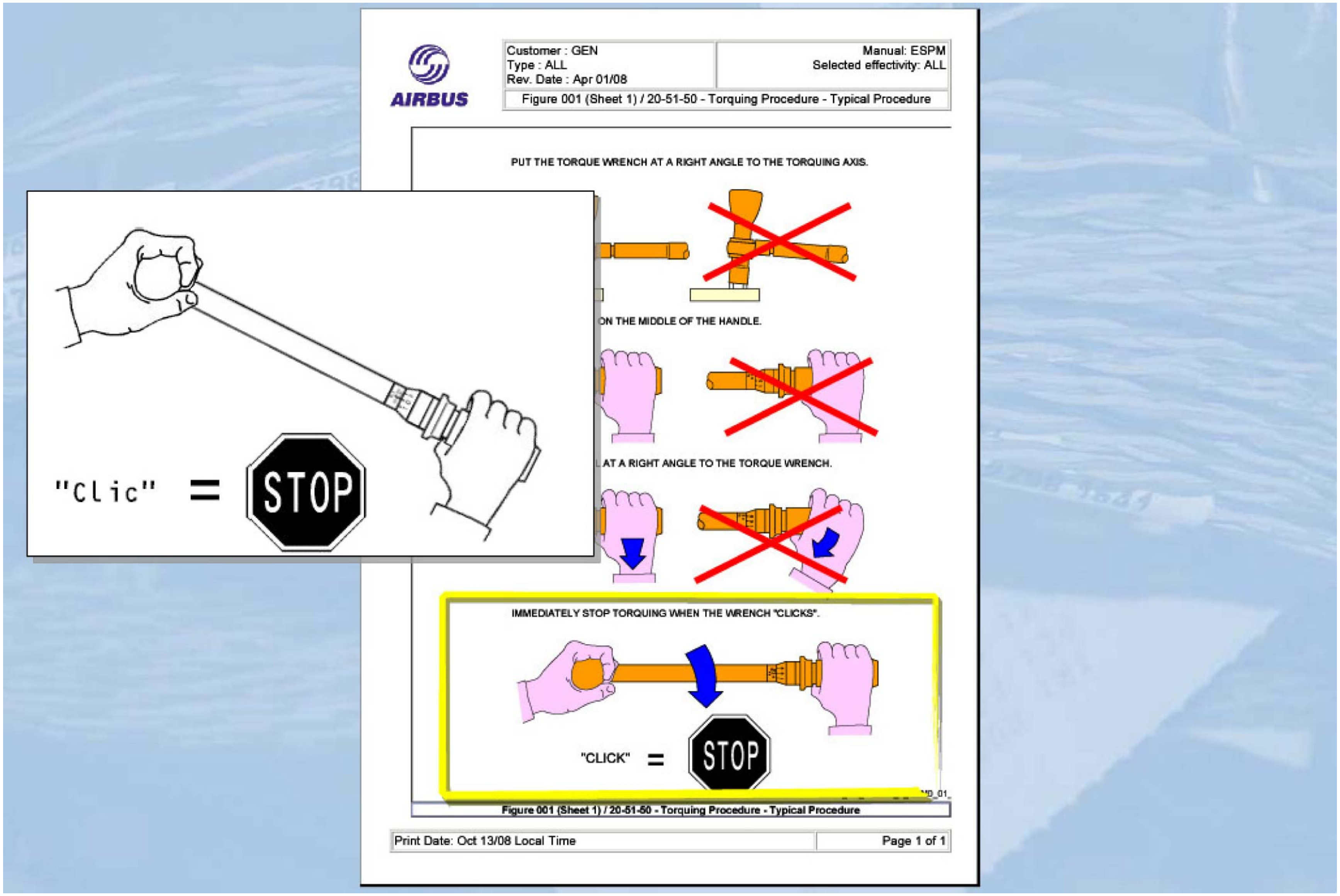


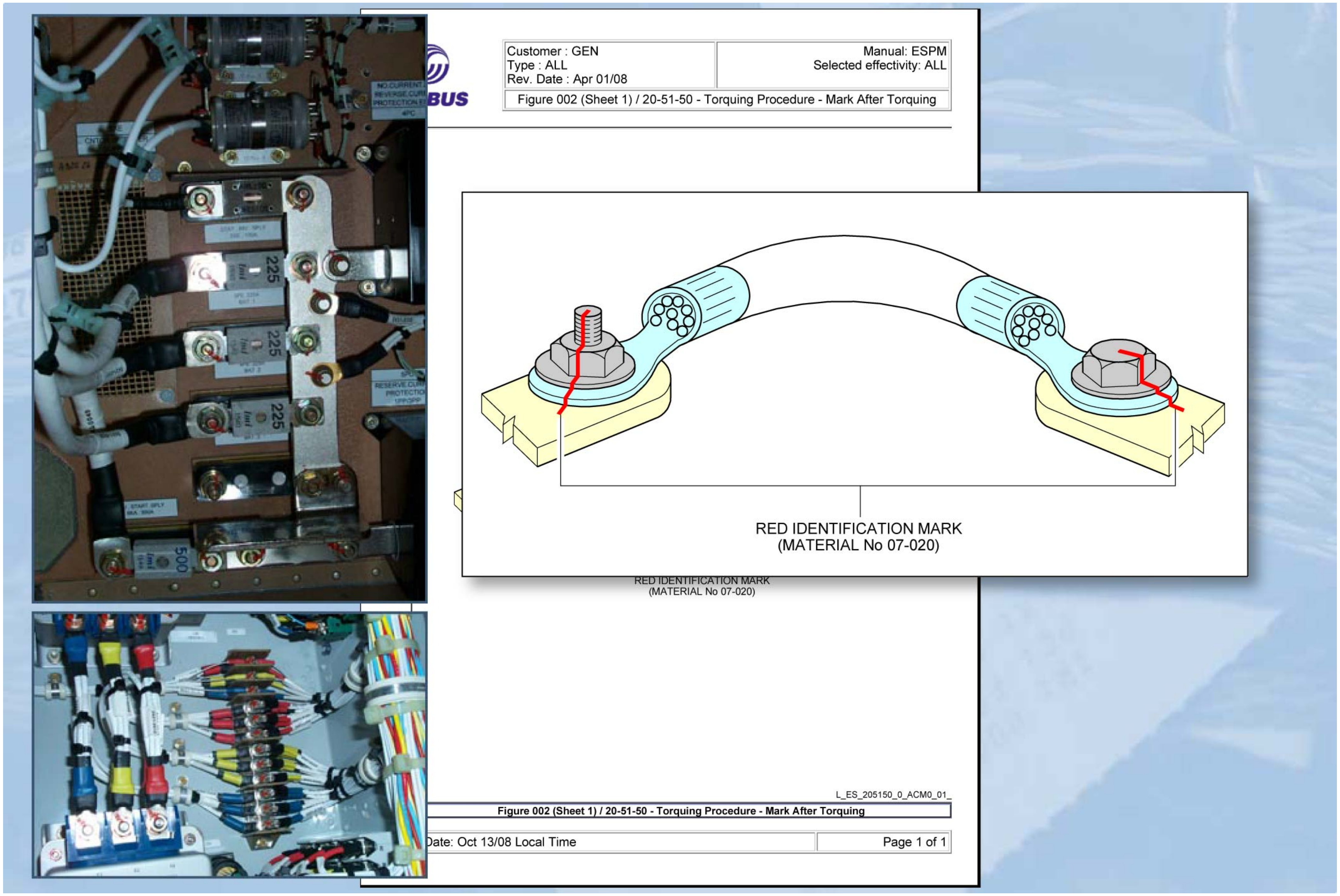
MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

X8U08481 - X0332T0 - XM2036000000001



MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

X8U08481 - X0332T0 - XM20360000000001



MODULAR/NON-MODULAR TERMINAL BLOCKS / TORQUE PRINCIPLE

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REPAIR PROCEDURES

GROUNDING MODULES

Grounding module repair procedure.
Example: ATA Chapter 20-53-50 gives the standard electrical item repair processes.
Now, you will find the information in ATA Chapter 20-53-54.
In Chapter 20-53-54 you will find the table of damage cases.
For example, for the contact retention clip, the only solution is to replace the grounding module.
This table gives you the repair scheme, and as you can see we must replace the component.
However, and because there is no identification for contact holes, it is possible to use a free cavity before changing the grounding module and this, at the next C-check.

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

STANDARD ELECTRICAL ITEM REPAIR PROCESSES - DESCRIPTION AND OPERATION

1. General
The chapters that follow give the repair processes for the standard electrical items in relation to the type of dammage.

2. How to Use the Repair Processes
When a standard electrical item has a dammage, do these steps:

A. Find or identify the item that has the dammage.

B. Find and correct the cause(s) of the dammage.

C. Make an accurate estimate of the type of dammage.
One or more repair schemes are possible.

R NOTE : If there is a risk of a new damage due to contamination, you can
R replace a non-sealed item by a sealed item.

3. Structure of the Chapters

A. Repair of Connectors and Pressure Seals (Ref. 20-53-51)

B. Repair of Backshells (Ref. 20-53-52)

C. Repair of Splices (Ref.20-53-53)

D. Repair of Electrical Components and Grounding Modules (Ref. 20-53-54)

ontacts (Ref. 20-53-55)

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GROUNDING MODULES

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

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The chapters that follow give the repair processes for the standard electrical items in relation to the type of dammage.

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3. Structure of the Chapters

A. Repair of Connectors and Pressure Seals (Ref. 20-53-51)

B. Repair of Backshells (Ref. 20-53-52)

C. Repair of Splices (Ref.20-53-53)

D. Repair of Electrical Components and Grounding Modules (Ref. 20-53-54)

E. Repair of Terminals and Contacts (Ref. 20-53-55)

EFF : ALL

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Apr 01/02

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GROUNDING MODULES

X8U08481 - X0332T0 - XM2036000000001

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
20-53-54 - REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES (Airbus)	

REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES (Airbus)

REPAIR OF ELECTRICAL COMPONENTS AND GROUNDING MODULES DESCRIPTION AND OPERATION

1. General
   This chapter gives the technical requirements of repairs for the electrical components and for the grounding modules.
2. Damage Check Procedure
   A. Electrical Components

   NOTE: If you find one of these components that is not in the correct condition, you must replace it with a component with the same P/N or with an equivalent P/N (Refer to IPC or SM):
   - Illuminated push-button switch
   - Push-button switch
   - Circuit breaker
   - Relay base and relay
   - Changeover switches (button or toggle)
   - Rotary switch
   - Limit switch
   - Terminal block
   - Modular terminal block
   - Indicator lights

   B. Grounding Module E0425
      (1) Table of damage cases
      (Ref. Fig. 001)

Figure 001.1 / Graphic SH 001.1 Repair of grounding Modules - Table of Damage cases E0425

B. Grounding Module E0425

(1) Table of damage cases
(Ref. Fig. 001)

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GROUNDING MODULES

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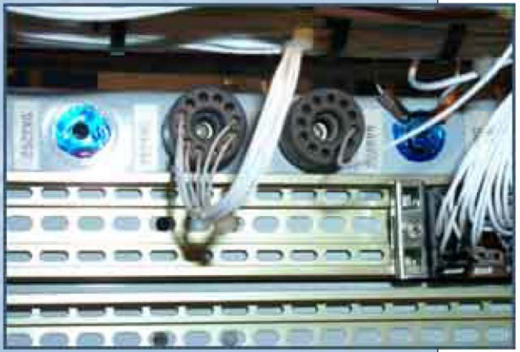

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL
Figure 001 (Sheet 1) / 20-53-54 - Repair of grounding Modules - Table of Damage cases E0425	

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
INSULATING BODY:	- CRACKED - CHIPPED - BROKEN - ATTACHMENT DAMAGED	REPLACE THE GROUNDING MODULE
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE GROUNDING MODULE
SEAL:	- DAMAGED - LOST	CHANGE THE SEAL

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Figure 001 (Sheet 1) / 20-53-54 - Repair of grounding Modules - Table of Damage cases E0425

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GROUNDING MODULES

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REPAIR PROCEDURES

PRESSURE SEALS

Repair of pressure seals (20-53-50).
Then, the breakdown in Chapter 20-53-50 will send you to the repair of pressure seals in Chapter 20-53-51.
In Chapter 20-53-51, the table of damage cases gives the repair scheme depending on the type of damage.
For example, for shell damage we must replace the connector.

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

STANDARD ELECTRICAL ITEM REPAIR PROCESSES - DESCRIPTION AND OPERATION

1. General
The chapters that follow give the repair processes for the standard electrical items in relation to the type of dammage.

2. How to Use the Repair Processes
When a standard electrical item has a dammage, do these steps:

   A. Find or identify the item that has the dammage.

   B. Find and correct the cause(s) of the dammage.

   C. Make an accurate estimate of the type of dammage.
   One or more repair schemes are possible.

   NOTE : If there is a risk of a new damage due to contamination, you can replace a non-sealed item by a sealed item.

3. Structure of the Chapters

   A. Repair of Connectors and Pressure Seals (Ref. 20-53-51)

   B. Repair of Backshells (Ref. 20-53-52)

   C. Repair of Splices (Ref.20-53-53)

   D. Repair of Electrical Components and Grounding Modules (Ref. 20-53-54)

   E. Repair of Terminals and Contacts (Ref. 20-53-55)

EFF : ALL

20-53-50 Page 1
Apr 01/02

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PRESSURE SEALS

X8U08481 - X0332T0 - XM203600000001

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ELECTRICAL STANDARD PRACTICES MANUAL

STANDARD ELECTRICAL ITEM REPAIR PROCESSES - DESCRIPTION AND OPERATION

1. General
The chapters that follow give the repair processes for the standard electrical items in relation to the type of dammage.

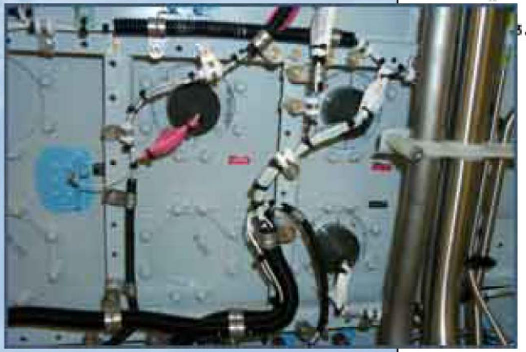
2. How to Use the Repair Processes
When a standard electrical item has a dammage, do these steps:

A. Find or identify the item that has the dammage.

B. Find and correct the cause(s) of the dammage.

C. Make an accurate estimate of the type of dammage.
One or more repair schemes are possible.

R NOTE : If there is a risk of a new damage due to contamination, you can
R replace a non-sealed item by a sealed item.



3. Structure of the Chapters

A. Repair of Connectors and Pressure Seals (Ref. 20-53-51)

B. Repair of Backshells (Ref. 20-53-52)

C. Repair of Splices (Ref.20-53-53)

D. Repair of Electrical Components and Grounding Modules (Ref. 20-53-54)

E. Repair of Terminals and Contacts (Ref. 20-53-55)

EFF : ALL

20-53-50 Page 1
Apr 01/02

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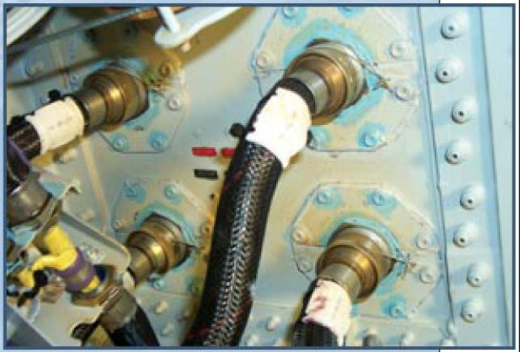
PRESSURE SEALS



AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

DAMAGE CASES	DAMAGE ASSESSMENT	REPAIR SCHEME
REAR SEAL OR GROMMET:	- TORN - NICKED - CRACKED	REPLACE THE CONNECTOR
SHELL OR HOUSING:	- CRACKED - CHIPPED - BROKEN - BACK THREADS DAMAGED	REPLACE THE CONNECTOR
HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE CONNECTOR
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE CONNECTOR
LOCKING DEFECTIVE:	- INOPERATIVE	REPLACE THE DEFECTIVE CONNECTOR (MALE OR FEMALE)
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
BLANKING PLUG/ PROTECTIVE COVER:	- LOST	INSTALL BLANKING PLUG

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Figure 002 (Sheet 1) / 20-53-51 - Repair of Circular Connectors - Table of Damage Cases

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PRESSURE SEALS

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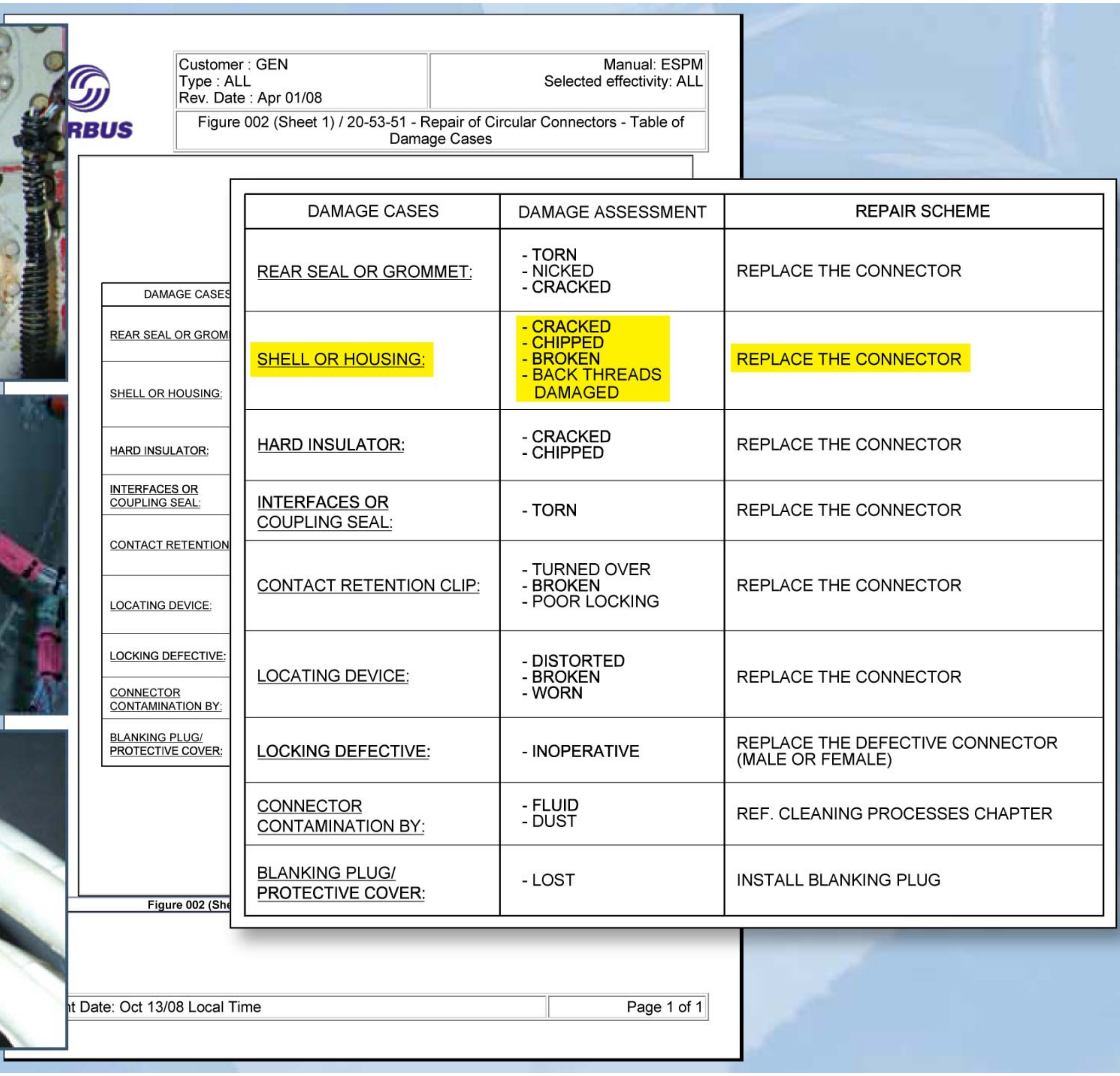

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

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HARD INSULATOR:	- CRACKED - CHIPPED	REPLACE THE CONNECTOR
INTERFACES OR COUPLING SEAL:	- TORN	REPLACE THE CONNECTOR
CONTACT RETENTION CLIP:	- TURNED OVER - BROKEN - POOR LOCKING	REPLACE THE CONNECTOR
LOCATING DEVICE:	- DISTORTED - BROKEN - WORN	REPLACE THE CONNECTOR
LOCKING DEFECTIVE:	- INOPERATIVE	REPLACE THE DEFECTIVE CONNECTOR (MALE OR FEMALE)
CONNECTOR CONTAMINATION BY:	- FLUID - DUST	REF. CLEANING PROCESSES CHAPTER
BLANKING PLUG/ PROTECTIVE COVER:	- LOST	INSTALL BLANKING PLUG

Figure 002 (She

t Date: Oct 13/08 Local Time | Page 1 of 1

PRESSURE SEALS

PRESSURE SEALS

GVI - DET/DI

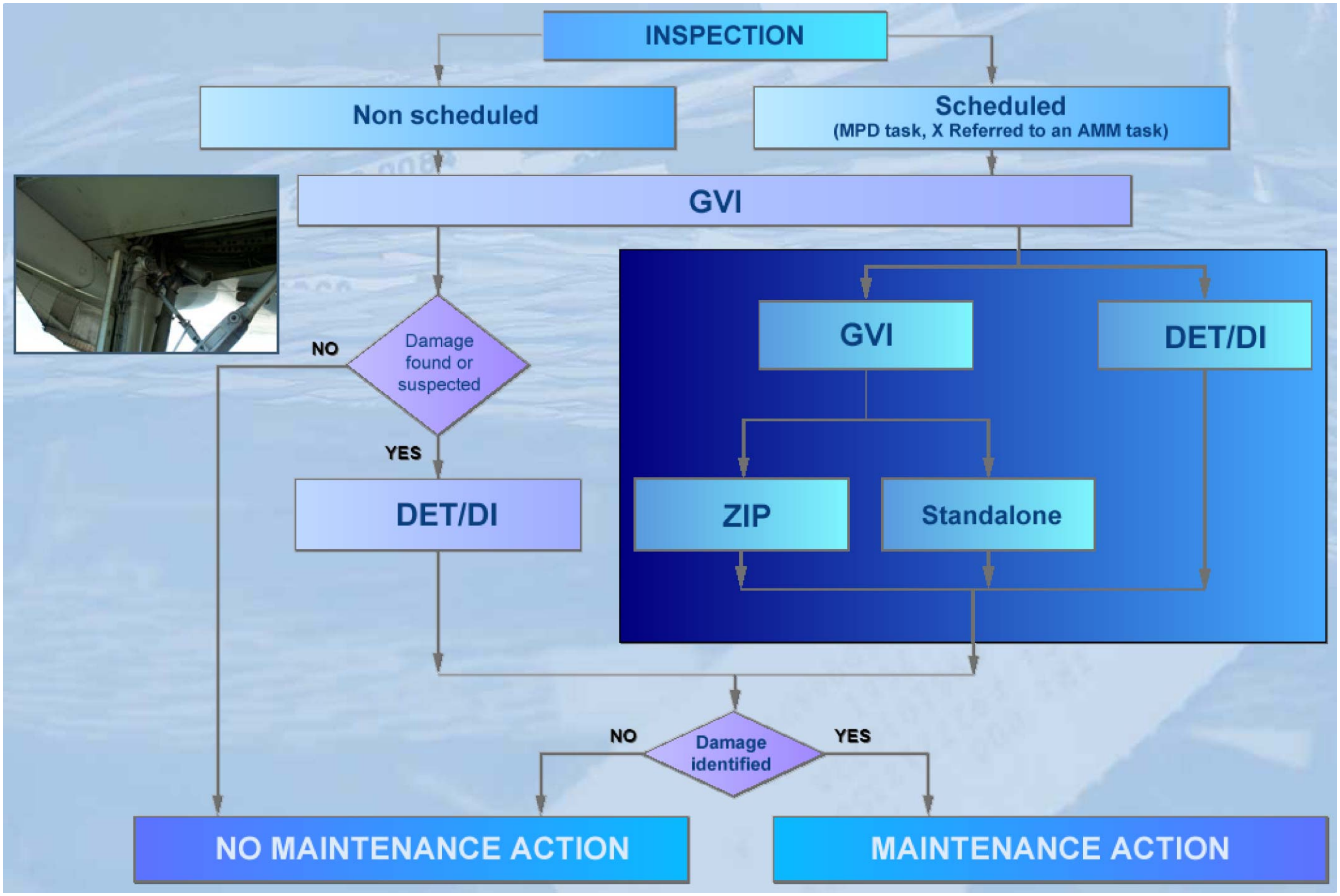
GVI - DET

This module shows you guidance to perform an inspection on aircraft.
The way to perform an inspection.
Reasons for wiring degradation
7 major causes of wiring degradation.
Vibration
Moisture
Maintenance
Indirect damage
Chemical contamination
Heat
Cleaning
To detect these damages, you must perform an inspection.
For a non-scheduled inspection, you must perform the inspection by following this flowchart philosophy.
2 types of inspection:
- GVI
- DET/DI

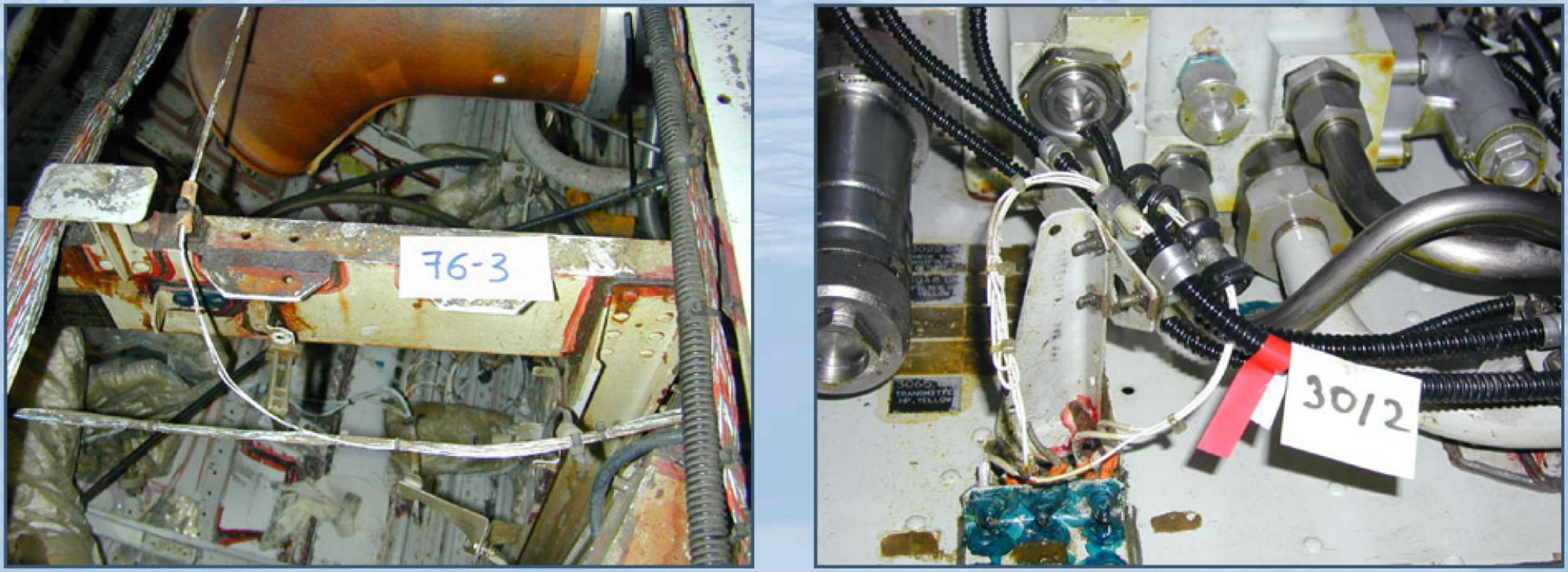
GVI (for General Visual Inspection) is a visual examination where damage or irregularity has to be detected.
This level of inspection is made under a touching distance otherwise specified. A mirror may be necessary to get good visual access to all surfaces in the inspected area. This inspection is implemented under normal lighting conditions such as daylight, hangar lighting and flashlight or may also require the removal or opening of access panels or doors. Stands, ladders or platforms may be required to get nearest to the area being checked.
DET/DI:
The Detail Inspection is an intensive examination of a specific item, installation or assembly to detect damage, failure or irregularity. Available lighting is normally supplemented with a correct lighting source at intensity deemed appropriate.
Surface cleaning and elaborated access procedure may be required.
Rule: during a maintenance operation, each time a wire or other electrical item is added, repaired, disconnected/reconnected and before to perform the close-up, you must:
- Do an inspection/check of the electrical item,
- Do integrity test of the related system(s) if applicable,

To do that, refer to one of the aircraft maintenance manual task in 05-51-43-page block 501.
If there is no integrity test, do an operational or functional test of the related function(s).
To make sure you did a correct inspection of electrical systems or equipment, you can refer to the documentation.
The ESPM will give you all details concerning the inspection of the item involved.

GVI - DET


INSPECTION
Non scheduled
Scheduled
(MPD task, X Referred to an AMM task)
GVI
NO
Damage found or suspected
YES
DET/DI
GVI
DET/DI
ZIP
Standalone
NO
Damage identified
YES
NO MAINTENANCE ACTION
MAINTENANCE ACTION

GVI - DET



GVI - DET

GVI - DET

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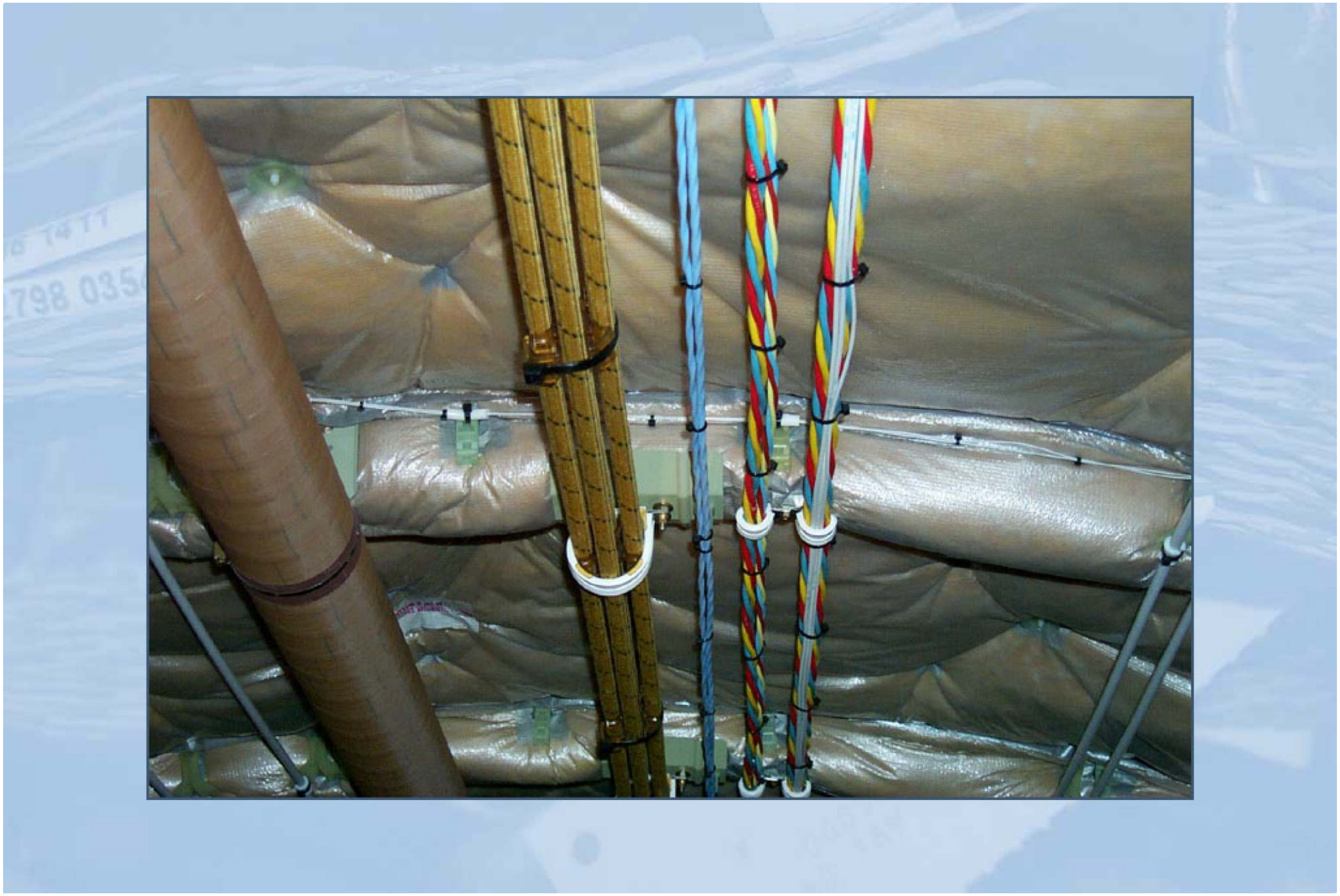

GVI - DET

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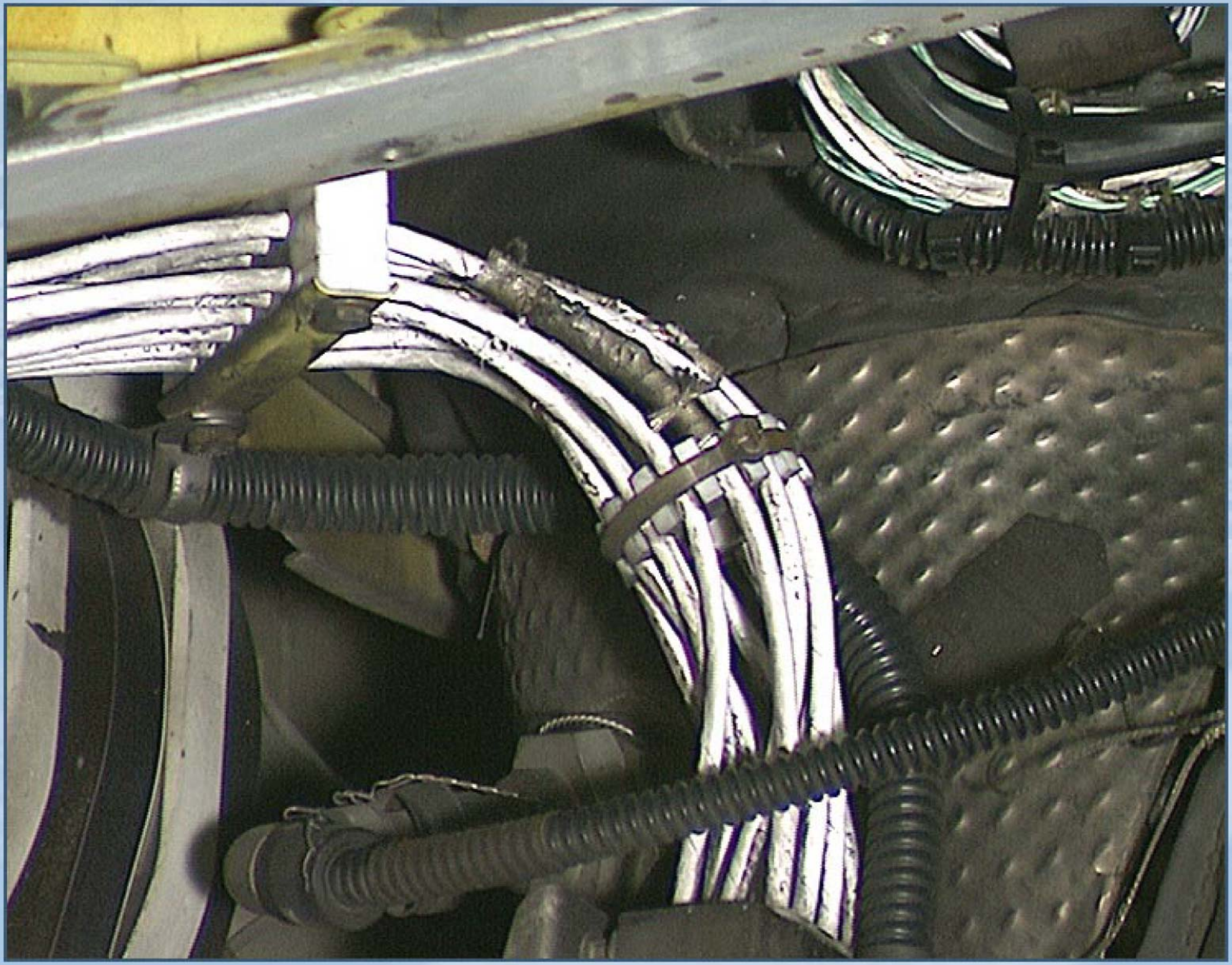
GVI - DET



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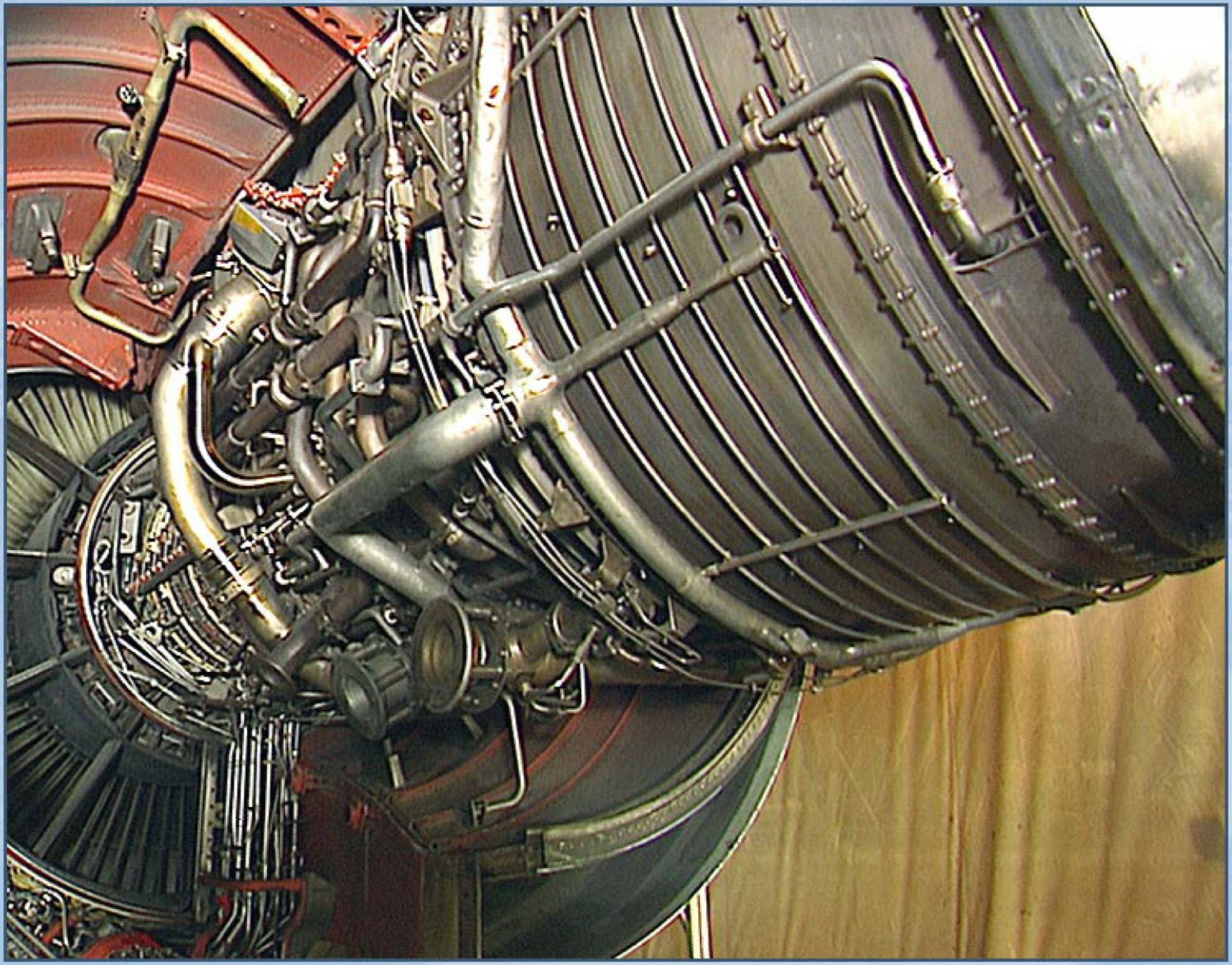
GVI - DET

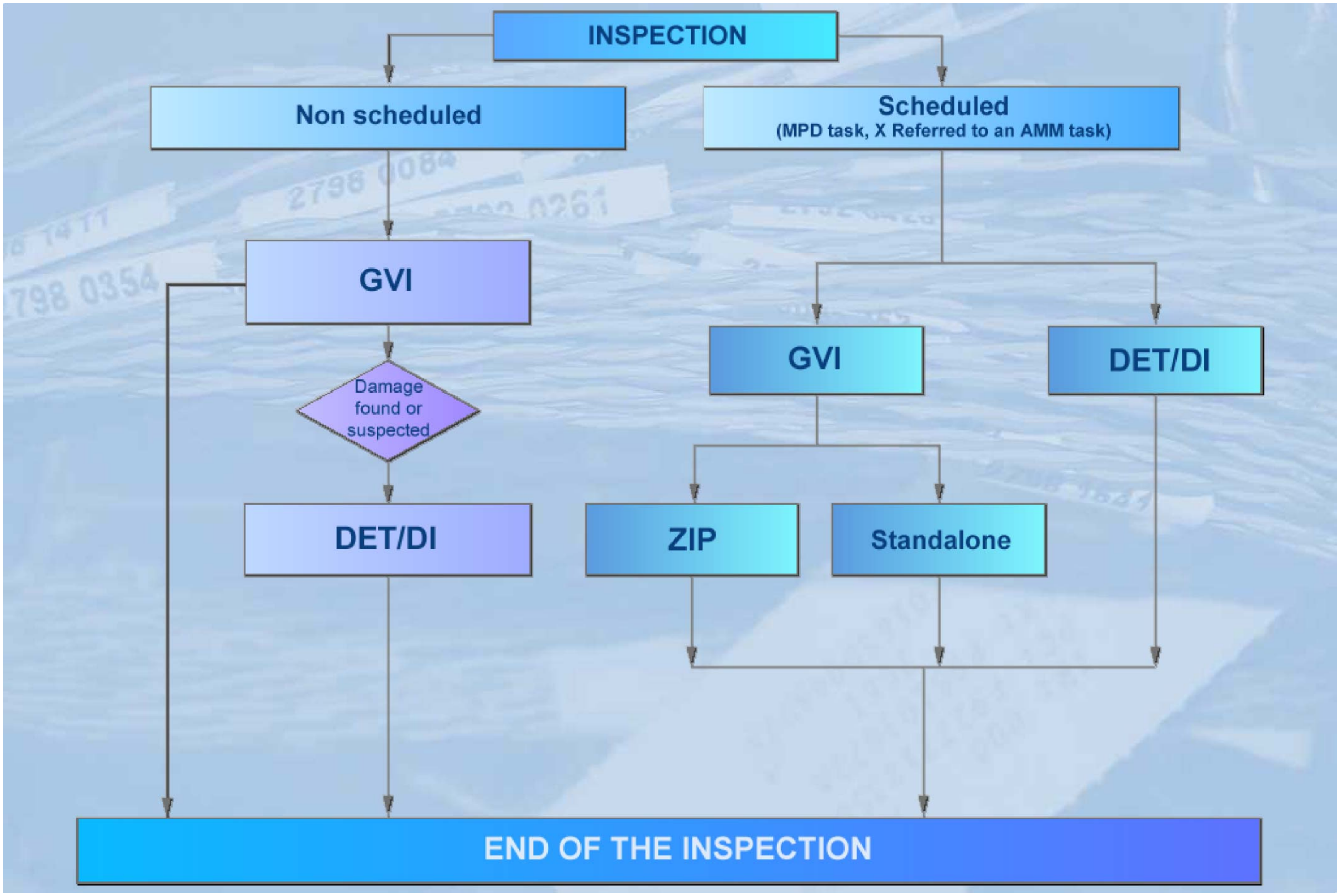
GVI - DET



GVI - DET

GVI - DET

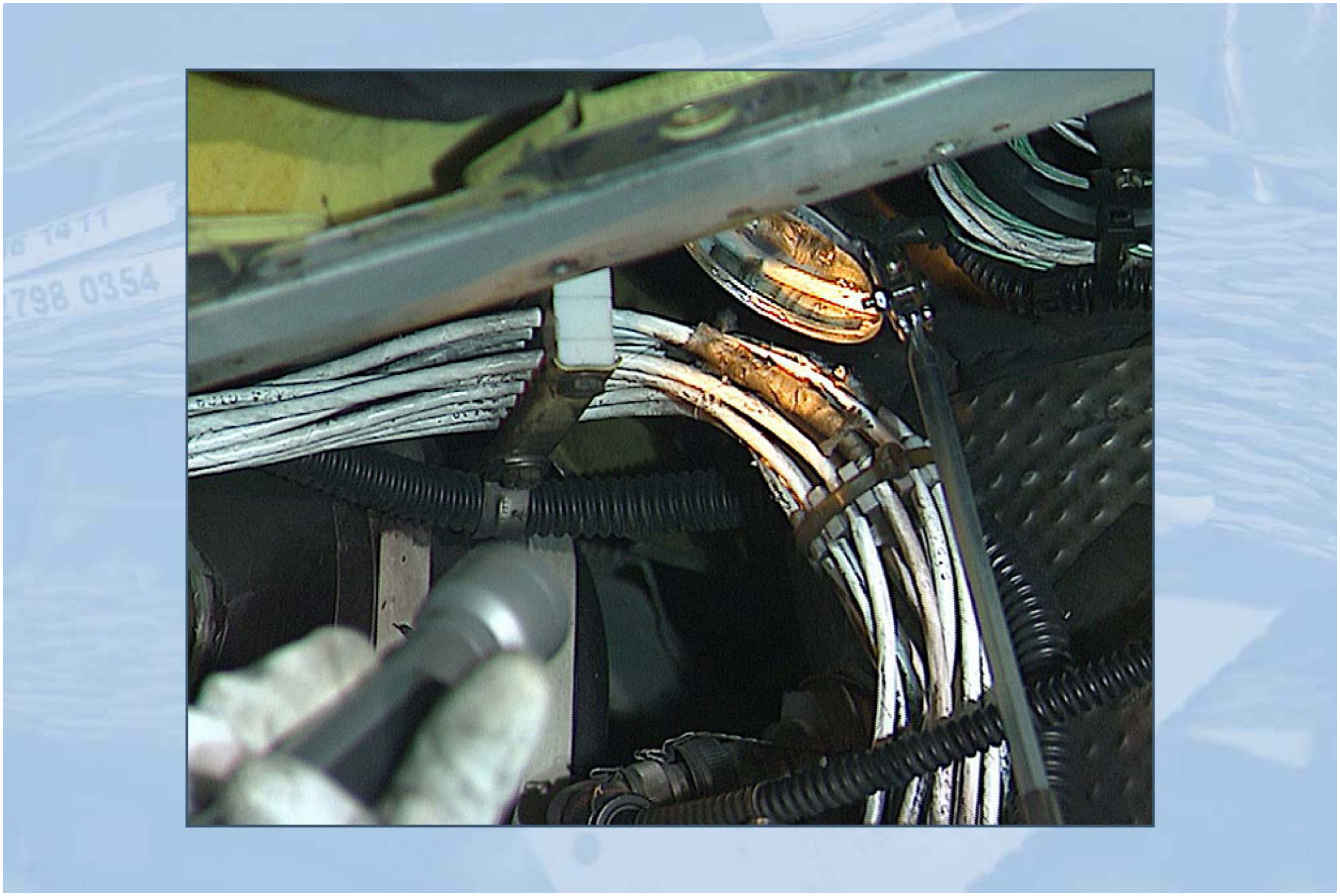
GVI - DET


INSPECTION
Non scheduled
Scheduled
(MPD task, X Referred to an AMM task)
GVI
Damage found or suspected
DET/DI
GVI
DET/DI
ZIP
Standalone
END OF THE INSPECTION

GVI - DET

GVI - DET

GVI - DET



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GVI - DET

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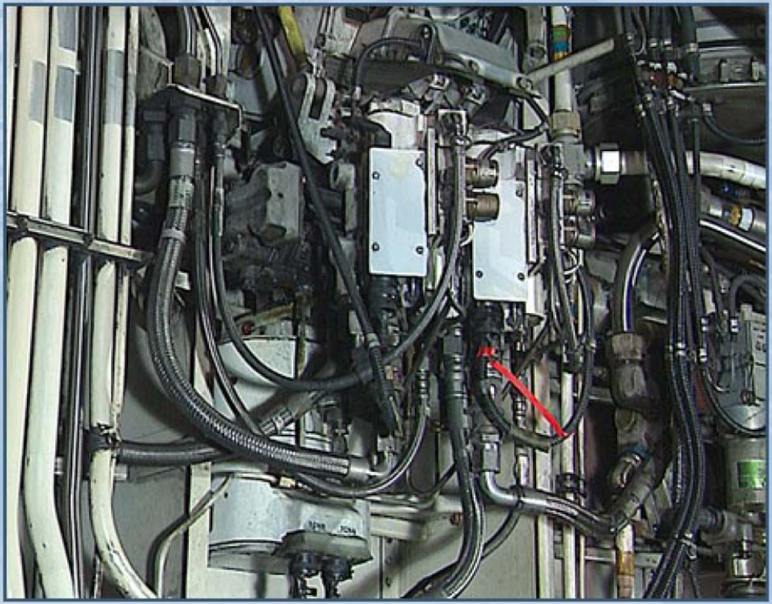
GVI - DET



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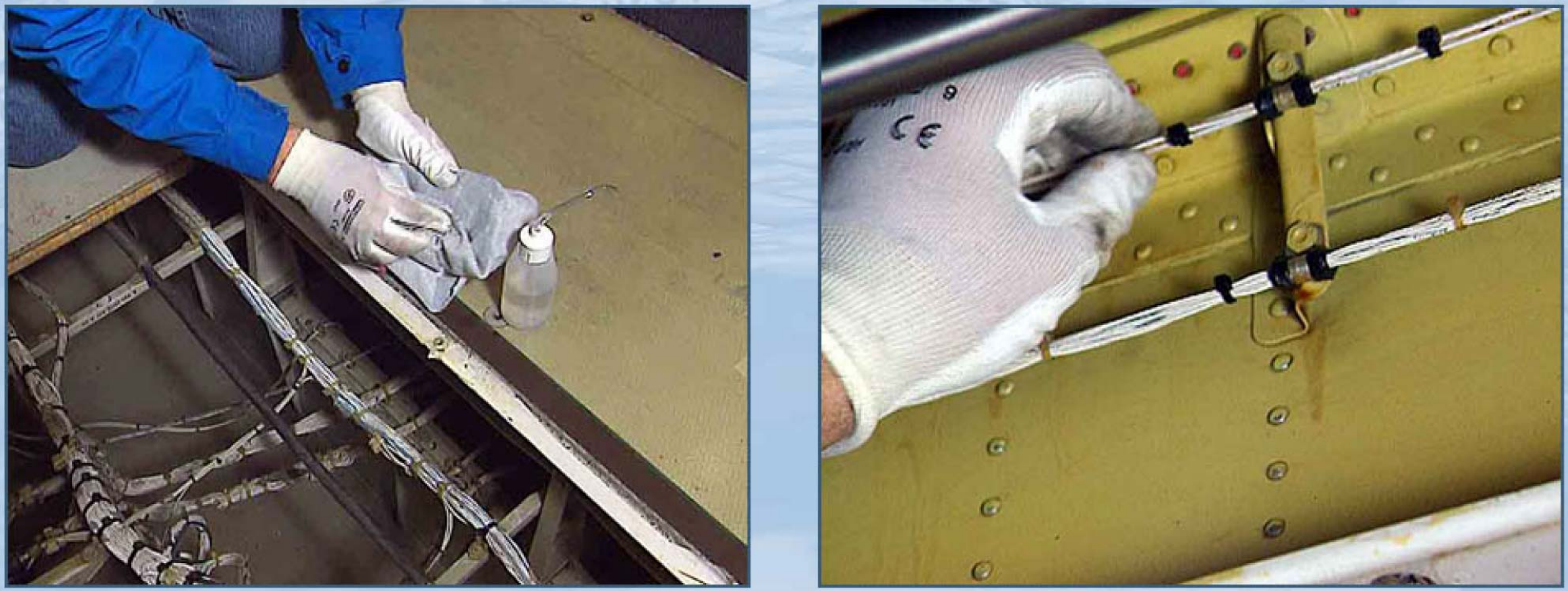

GVI - DET

GVI - DET

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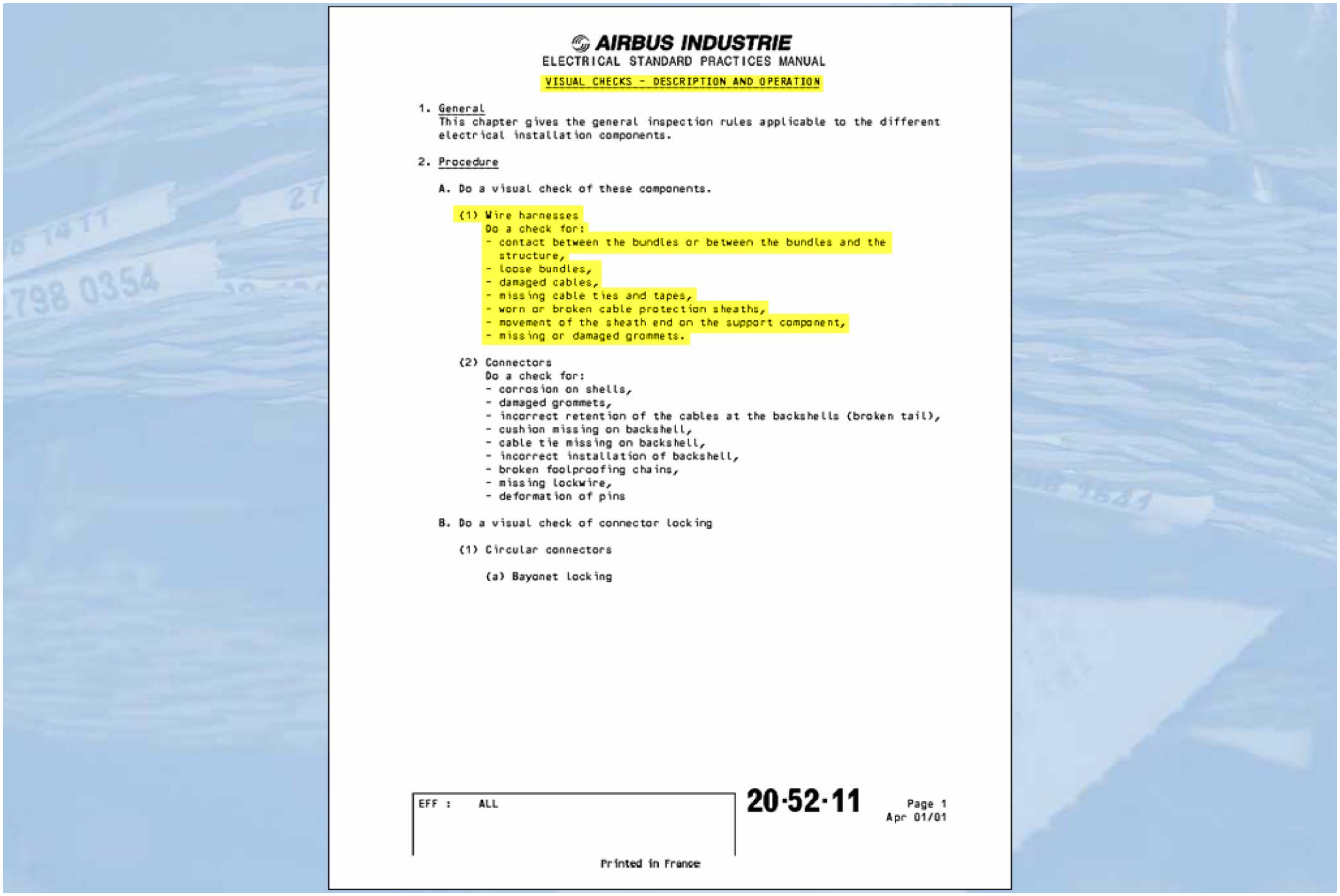
A321
Aircraft Wiring Manual
Aircraft Schematic Manual
XF
A320
AWL
Aircraft Wiring List
SEE README FILE FIRST
24·21·00
24·22·09

GVI - DET



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

VISUAL CHECKS - DESCRIPTION AND OPERATION

1. General
This chapter gives the general inspection rules applicable to the different electrical installation components.

2. Procedure

A. Do a visual check of these components.

(1) Wire harnesses
Do a check for:
- contact between the bundles or between the bundles and the structure,
- loose bundles,
- damaged cables,
- missing cable ties and tapes,
- worn or broken cable protection sheaths,
- movement of the sheath end on the support component,
- missing or damaged grommets.

(2) Connectors
Do a check for:
- corrosion on shells,
- damaged grommets,
- incorrect retention of the cables at the backshells (broken tail),
- cushion missing on backshell,
- cable tie missing on backshell,
- incorrect installation of backshell,
- broken foolproofing chains,
- missing lockwire,
- deformation of pins

B. Do a visual check of connector locking

(1) Circular connectors

(a) Bayonet locking

EFF : ALL

20-52-11 Page 1
Apr 01/01

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GVI - DET

GVI - DET

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HUMAN FACTOR IN INSPECTION

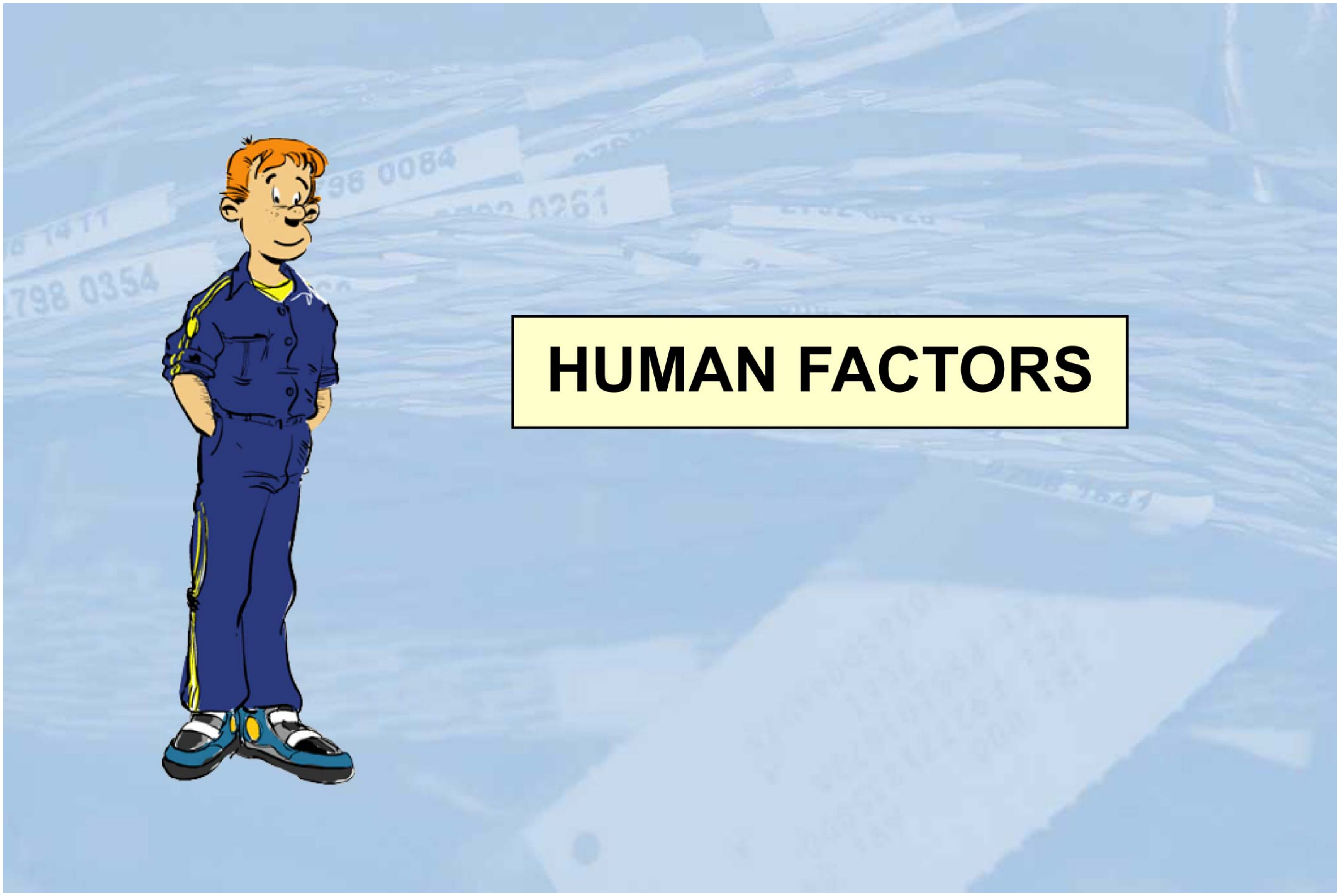
HUMAN FACTORS IN INSPECTION

This part will give you some recommendations about the human factors.
80% of accidents/incidents => Human error
10% of accidents/incidents => Aircraft
10% of accidents/incidents => Other causes
In these 80% of human error, 60% are due to the flight crew, 12% due to the airport environment (ATC, cargo loader, etc...) and 8% due to the maintenance.
As you certainly agree, it is more important, when an error occurs to find why the error occurs than to find who made the error.
This is of course in the goal to prevent another identical (or similar) error.
12 major causes:
Communication, complacency, lack of knowledge, distraction, lack of teamwork, fatigue, lack of resources, pressure, lack of assertiveness, stress, lack of awareness and norms.
The lacks of communication safety nets are:
- Use A/C maintenance inspection task, worksheets, logbook, etc, to communicate and remove doubts.
- Discuss work to be done or what has been completed.
- Never assume anything.
Complacency safety nets:
- Train yourself to expect to find a fault.
- Never sign for anything you didn't do.
Lack of knowledge safety nets:
- Get training on type.
- Use up to date manuals.
- Ask a tech-rep or someone who knows.
Distraction safety nets:
- Always finish the job or unfasten the connection.
- Mark the uncompleted work.
- Use lockwire where possible or use torqueseal.
- Double inspect by another or self.
- When you return to the job, always go back three step before.
- Use a detailed check sheet.
Lack of teamwork safety nets:
- Discuss what, who and how a job is to be done.
- Be sure that everyone understands and agrees.
Fatigue safety nets:
- Be aware of the symptoms and look for them in yourself and others.
- Plan to avoid complex tasks at the bottom of your circadian rhythm.
- Sleep and exercise regularly.
- Ask others to check your work.
Lack of resources safety nets:
- Check suspects areas at the beginning of the inspection and AOG the required parts.
- Order and stock anticipated parts before they are required.
- Know all available parts sources and arrange for pooling on loaning.
- Maintain a standard and if in doubt ground the aircraft.
Pressure safety nets:
- Be sure the pressure is not self-induced.
- Communicate your concerns.
- Ask for extra help.
- Just say no.
Lack of assertiveness safety nets:
- If it is not critical, record it in the journey logbook and only sign for what is serviceable.
- Refuse to compromise your standards.
Stress safety nets:
- Be aware of how stress can affect your work.
- Stop and look rationally at the problem.
- Determine a rational course of action and follow it.
- Take time off or at least have a short break.
- Ask follow workers to monitor your work.
- Exercise your body.
Lack of awareness safety nets:

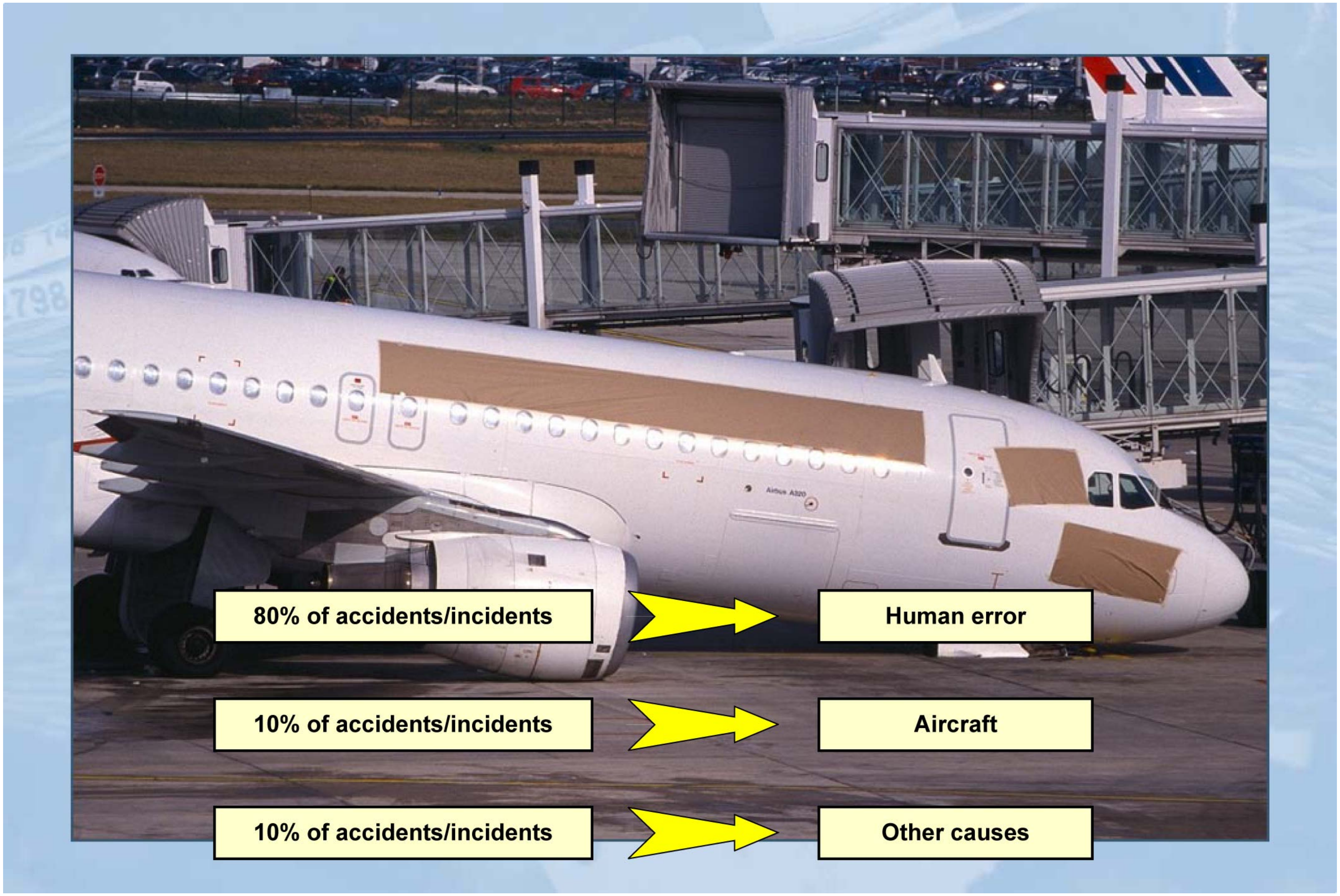
- Think of what may occur in the event of an accident.
- Check to see if your work will conflict with an existing modification or repair.
- Ask others if they can see any problem with the work done.

Norm safety nets:

- Always work as per the instructions or have the instructions changed.
- Be aware that "norms" don't make it right.



HUMAN FACTORS IN INSPECTION



HUMAN FACTORS IN INSPECTION

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HUMAN FACTORS IN INSPECTION

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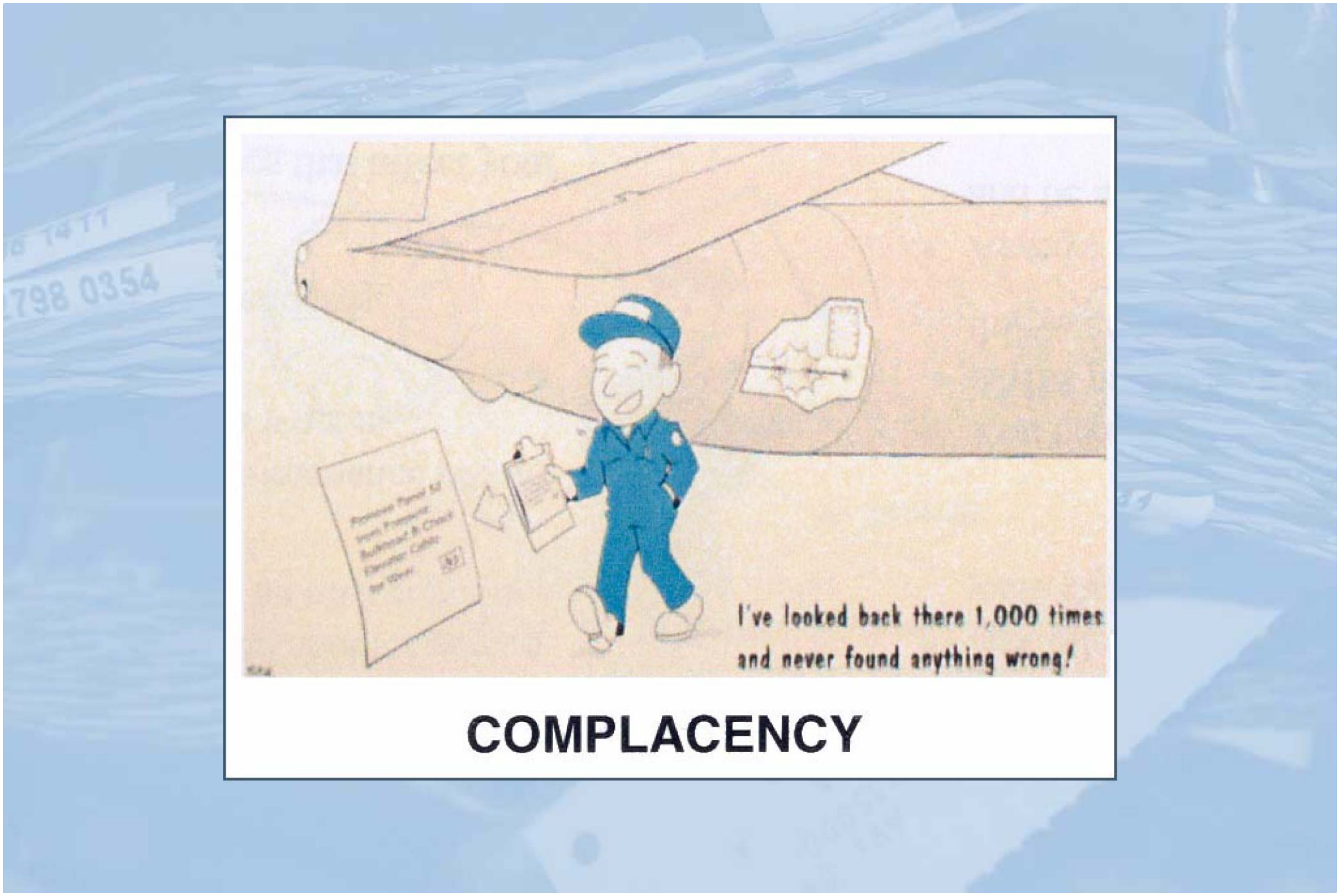

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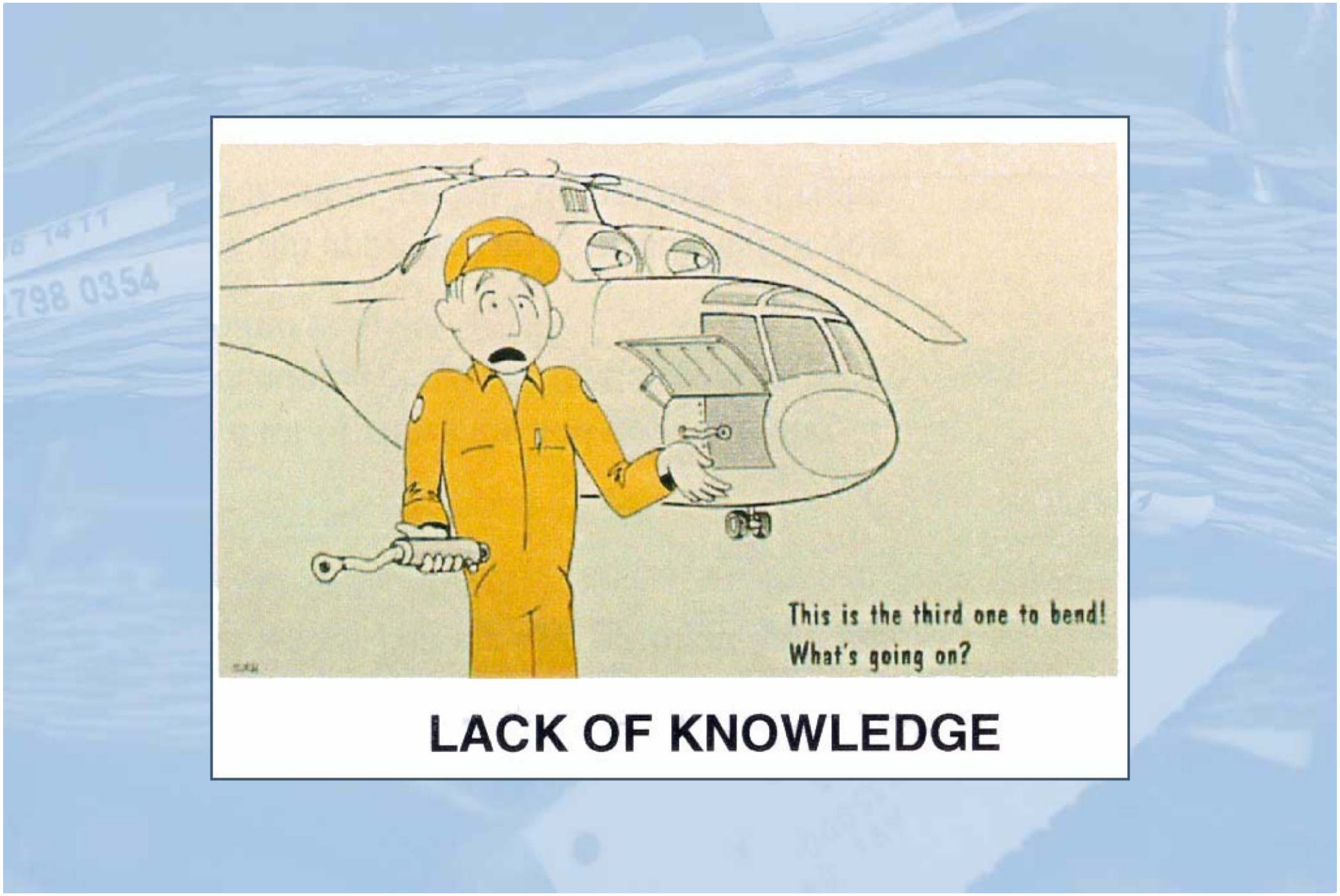

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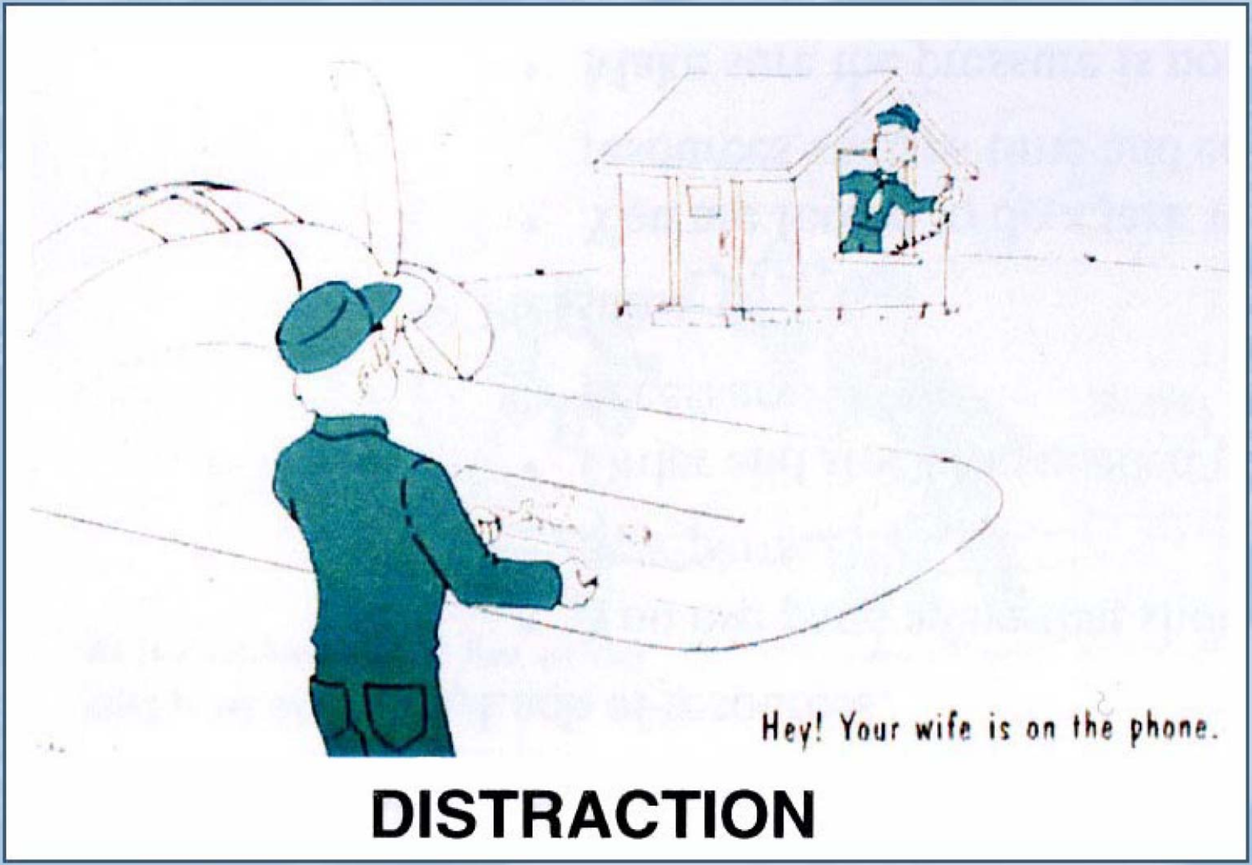

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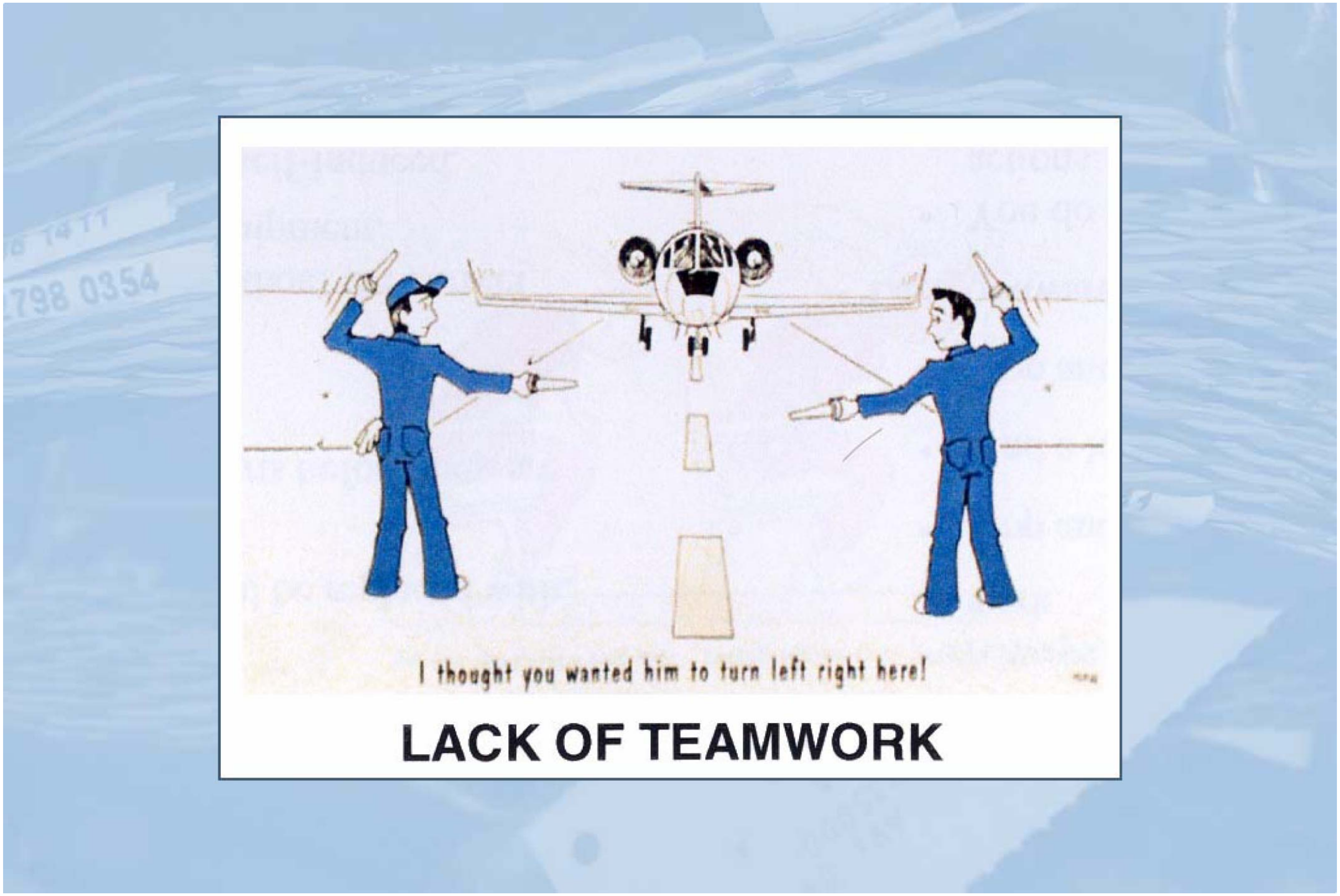

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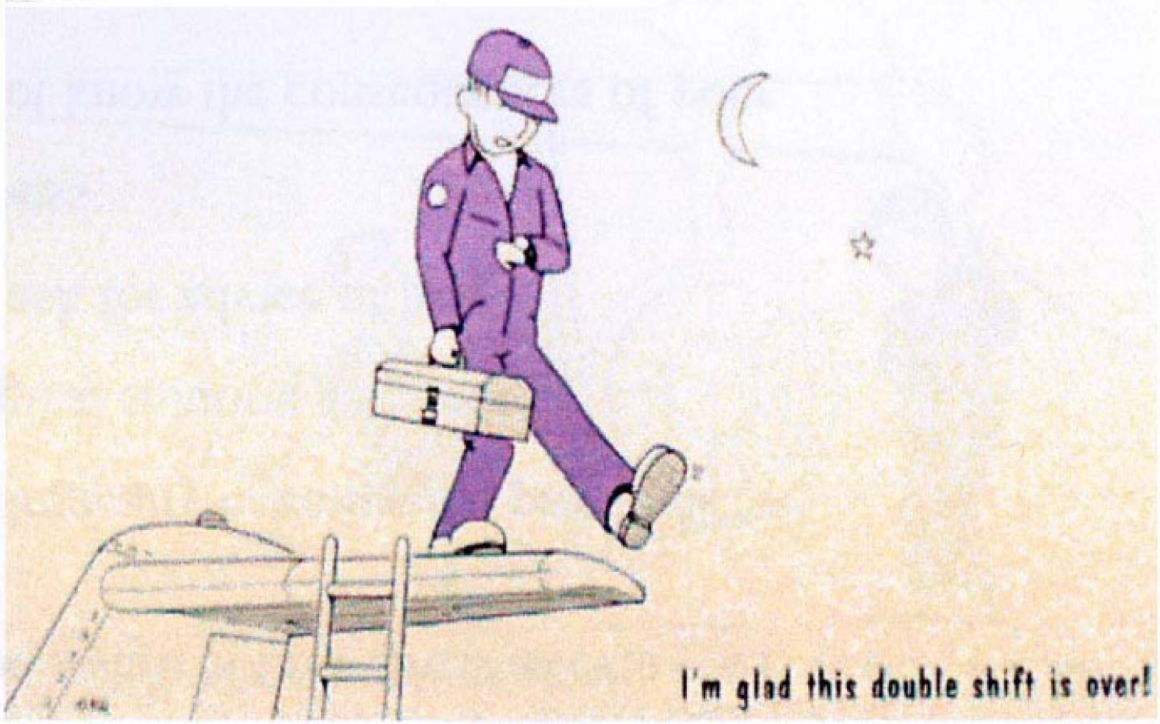

FATIGUE

HUMAN FACTORS IN INSPECTION

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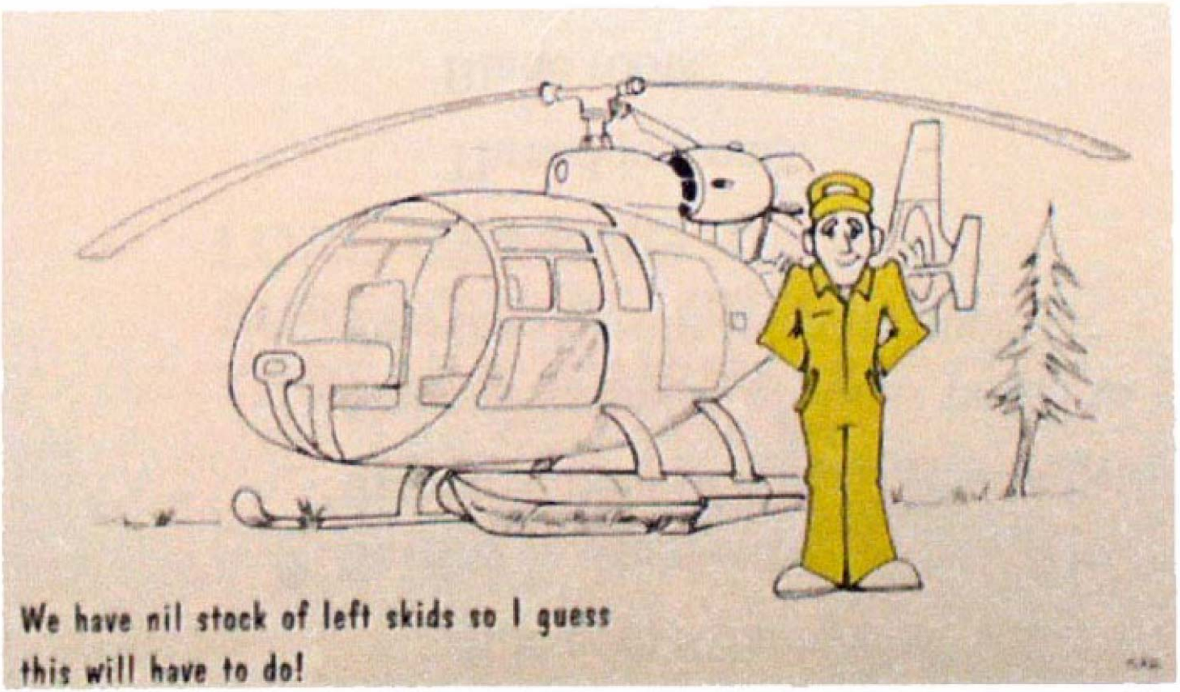

LACK OF RESOURCES

HUMAN FACTORS IN INSPECTION

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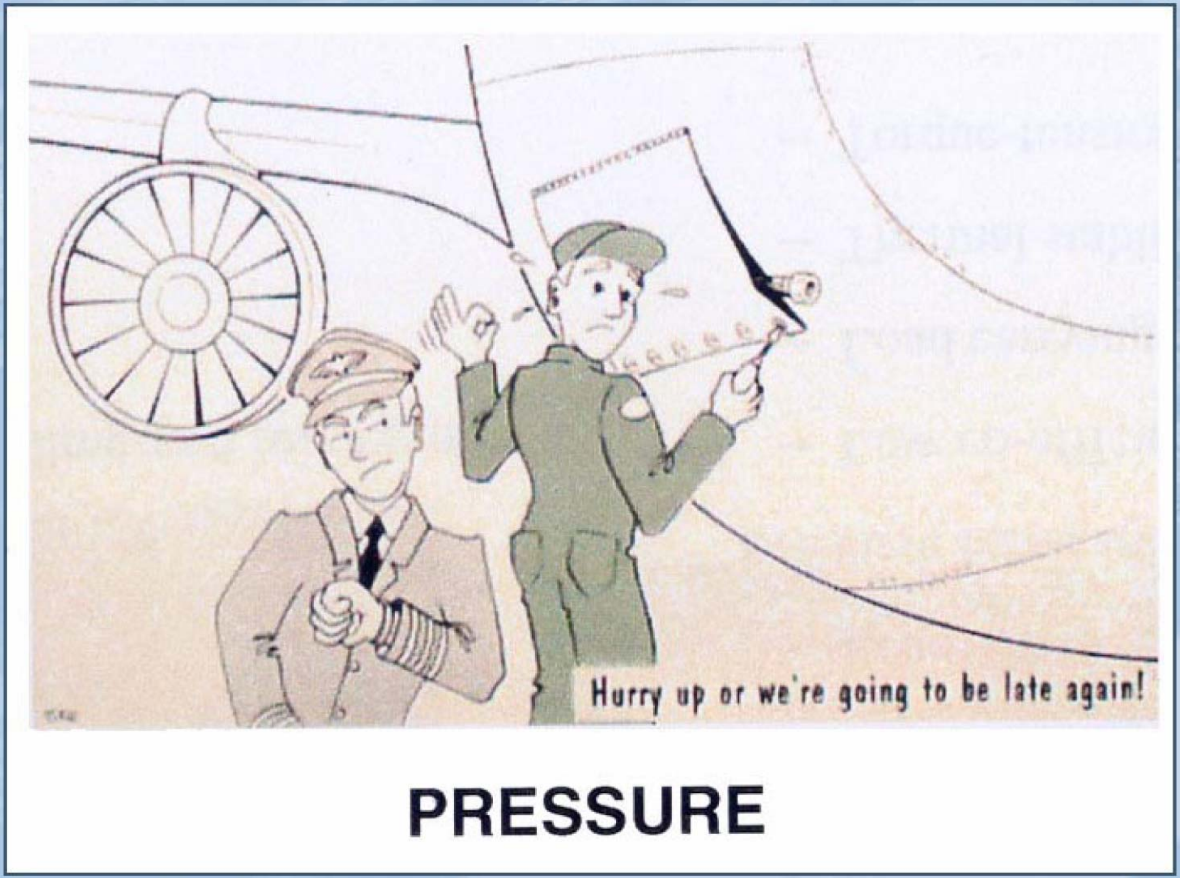

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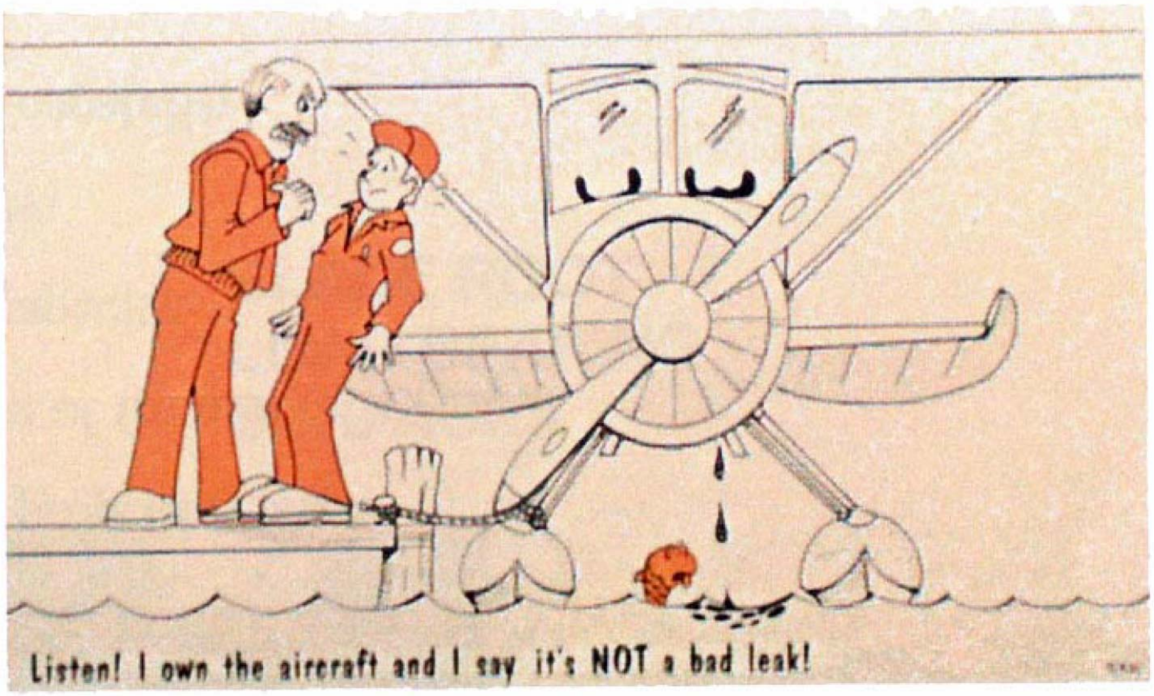
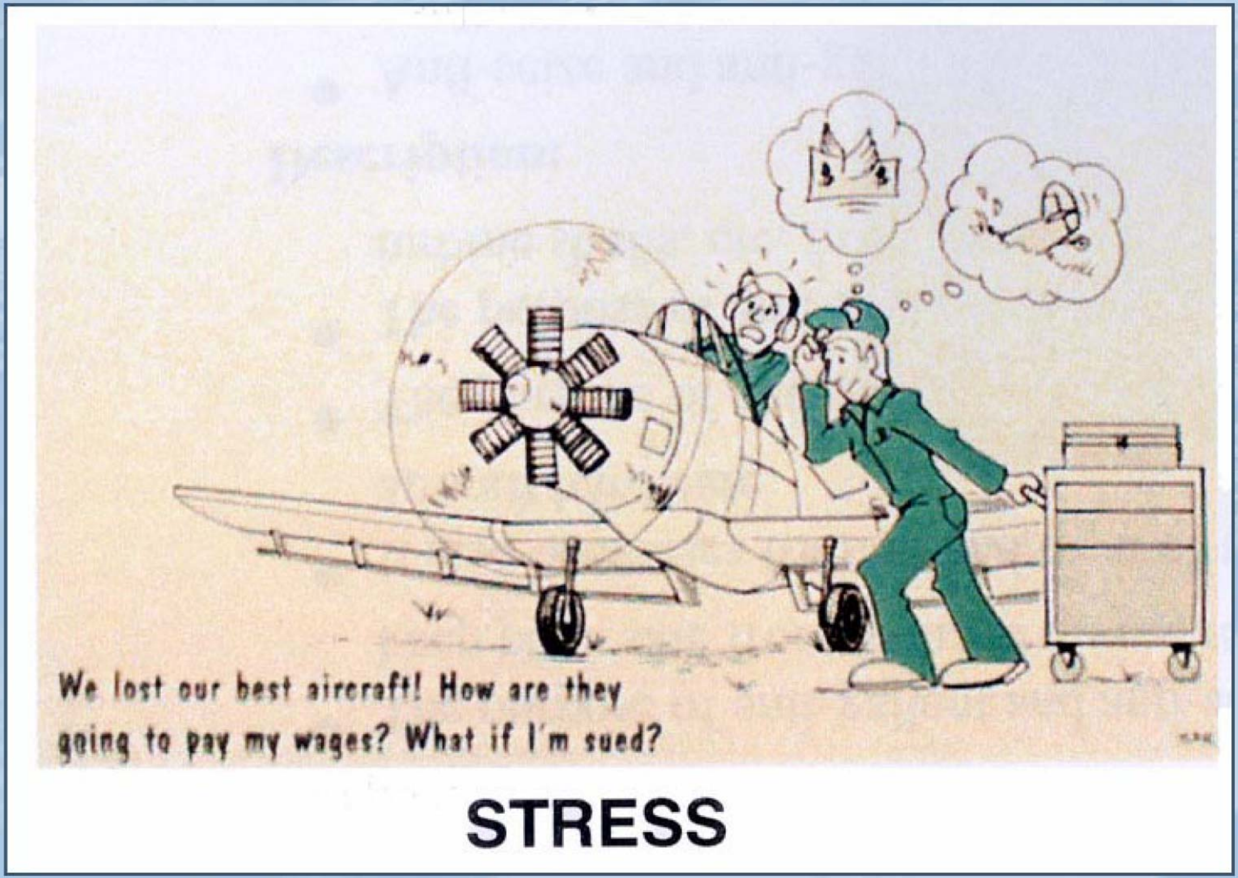


LACK OF ASSERTIVENESS

HUMAN FACTORS IN INSPECTION



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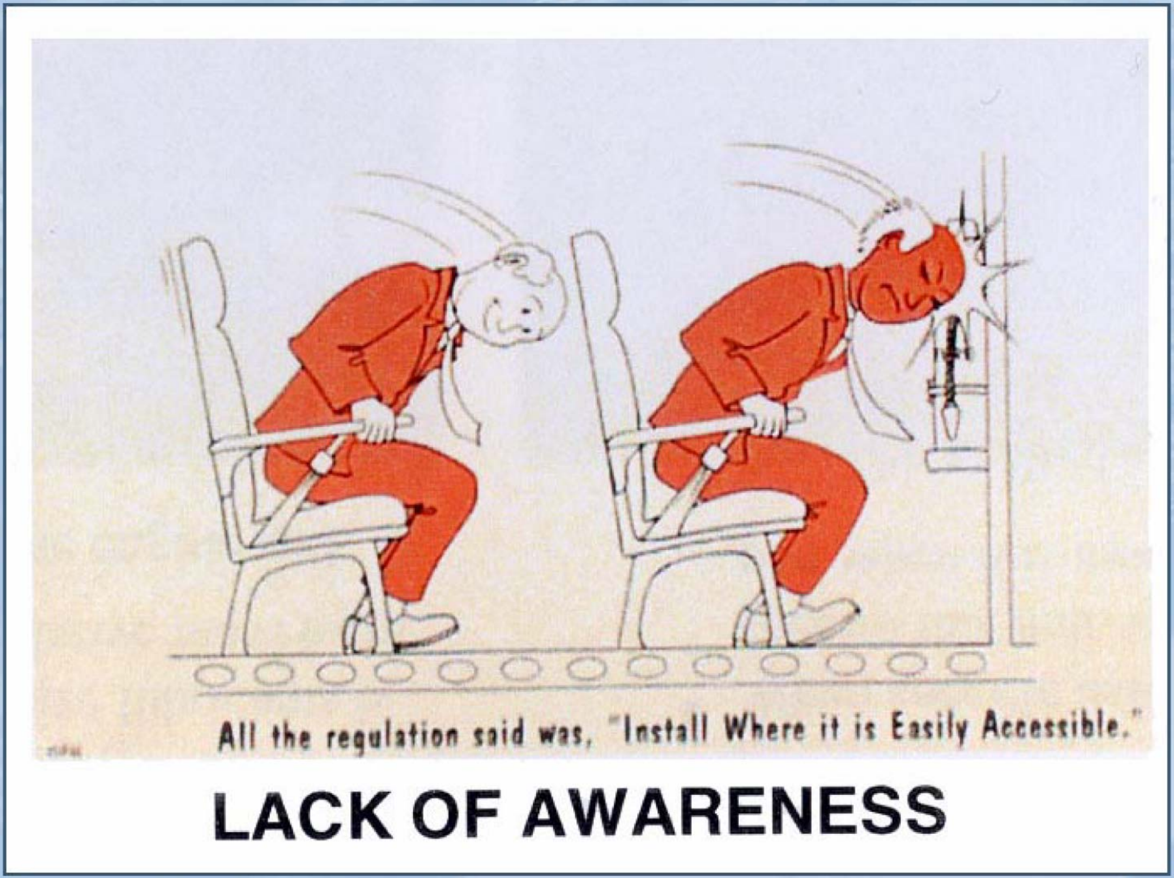

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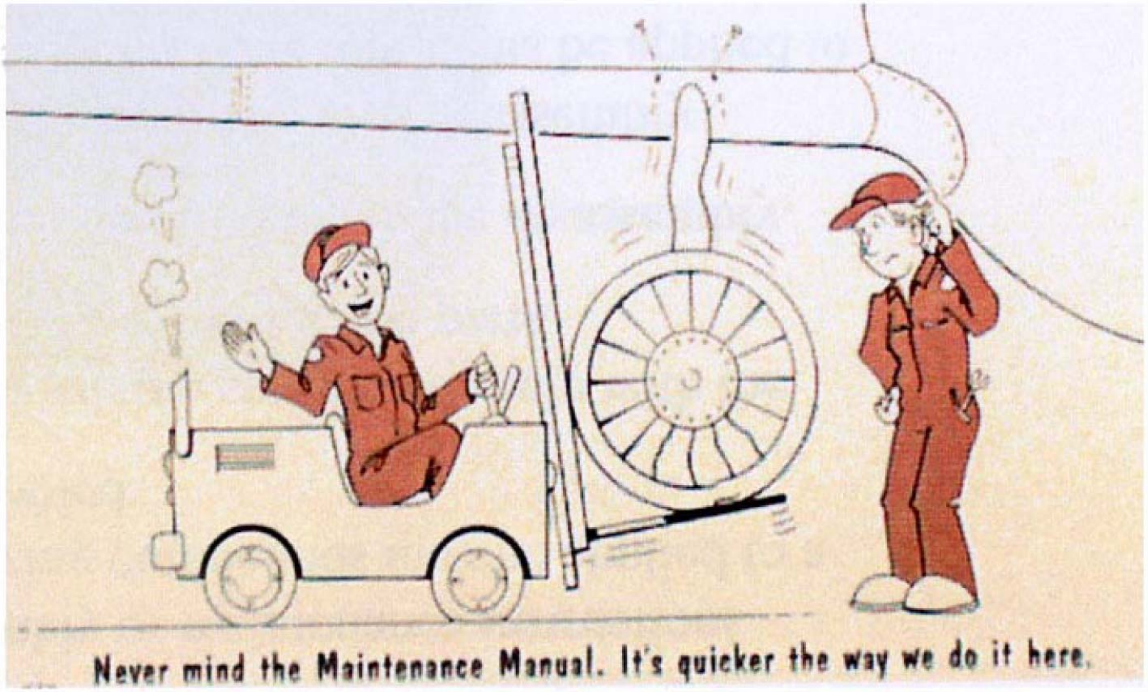

NORMS

HUMAN FACTORS IN INSPECTION

HUMAN FACTORS IN INSPECTION

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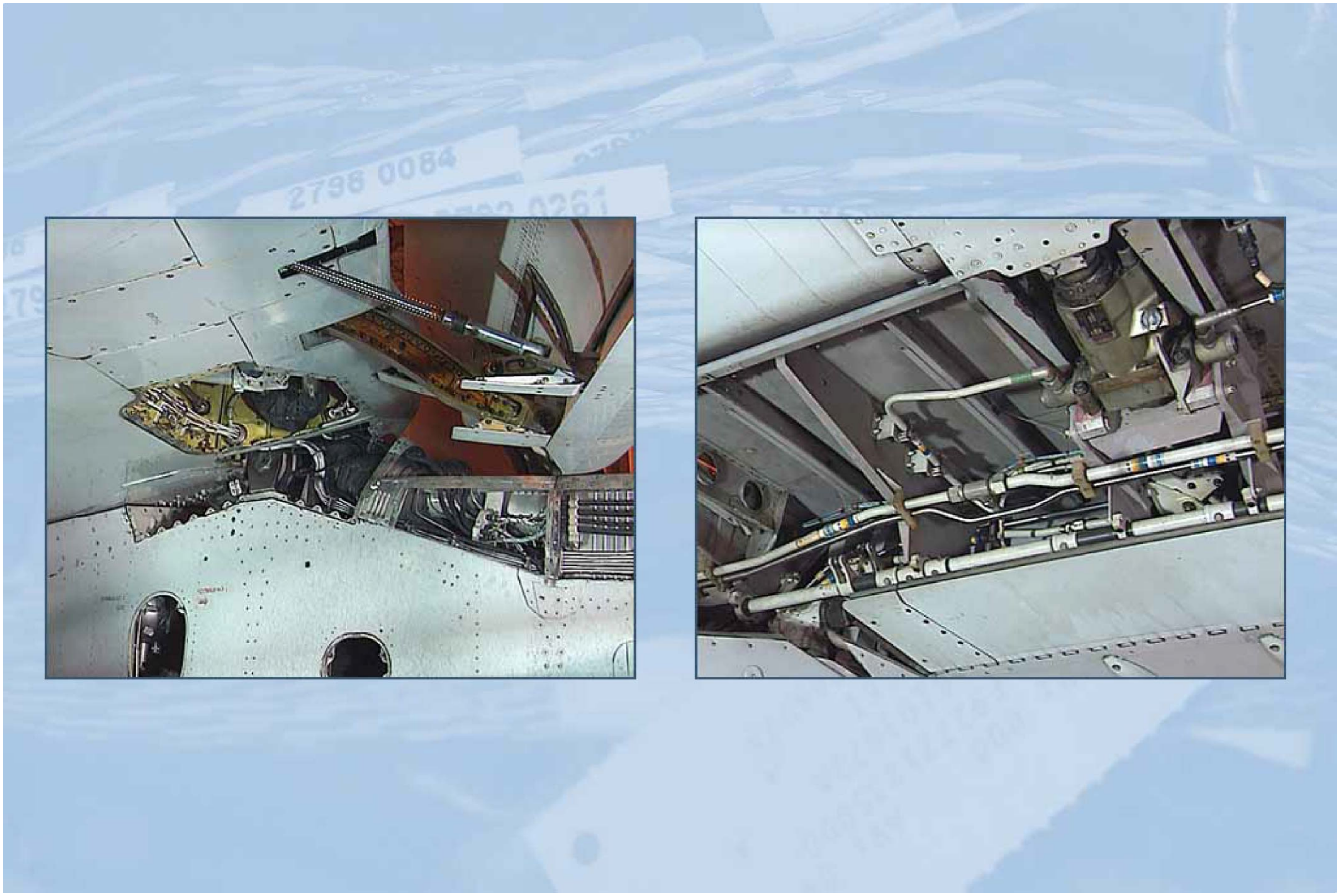
ZONAL AREAS OF INSPECTION

ZONAL AREAS OF INSPECTION

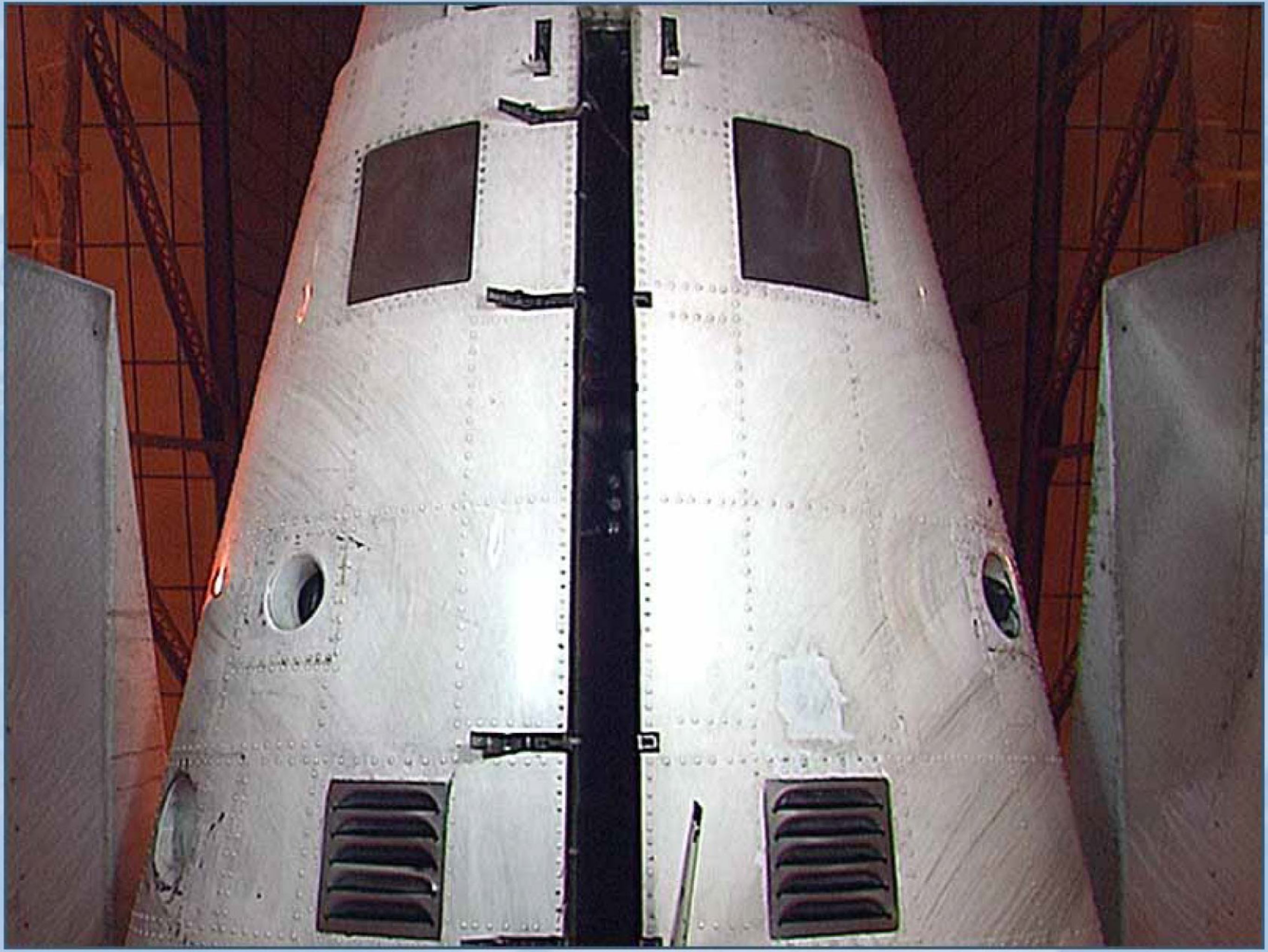
This module will give you the areas, which must receive a special attention.
Wings
Engines, pylon and nacelle area
APU (Auxiliary Power Unit)
Landing gears and wheels wells
Electrical panels and LRU's
Batteries
Power feeders.
Under galleys and lavatories.
Cargo bay / under floor.
Surfaces, controls and doors.
Access panels
Under doors.
Under cockpit sliding windows.

ZONAL AREAS OF INSPECTION



ZONAL AREAS OF INSPECTION

ZONAL AREAS OF INSPECTION



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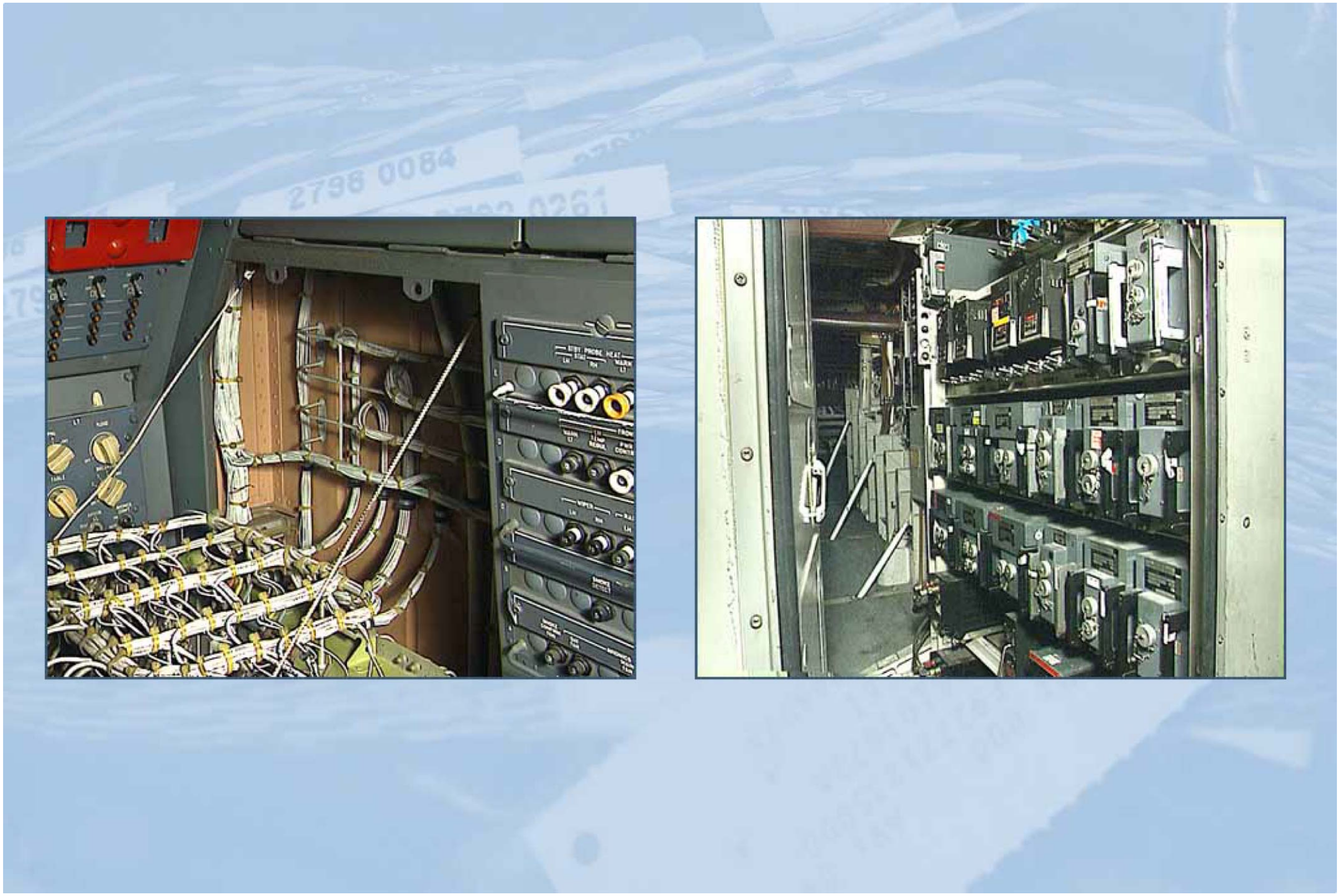

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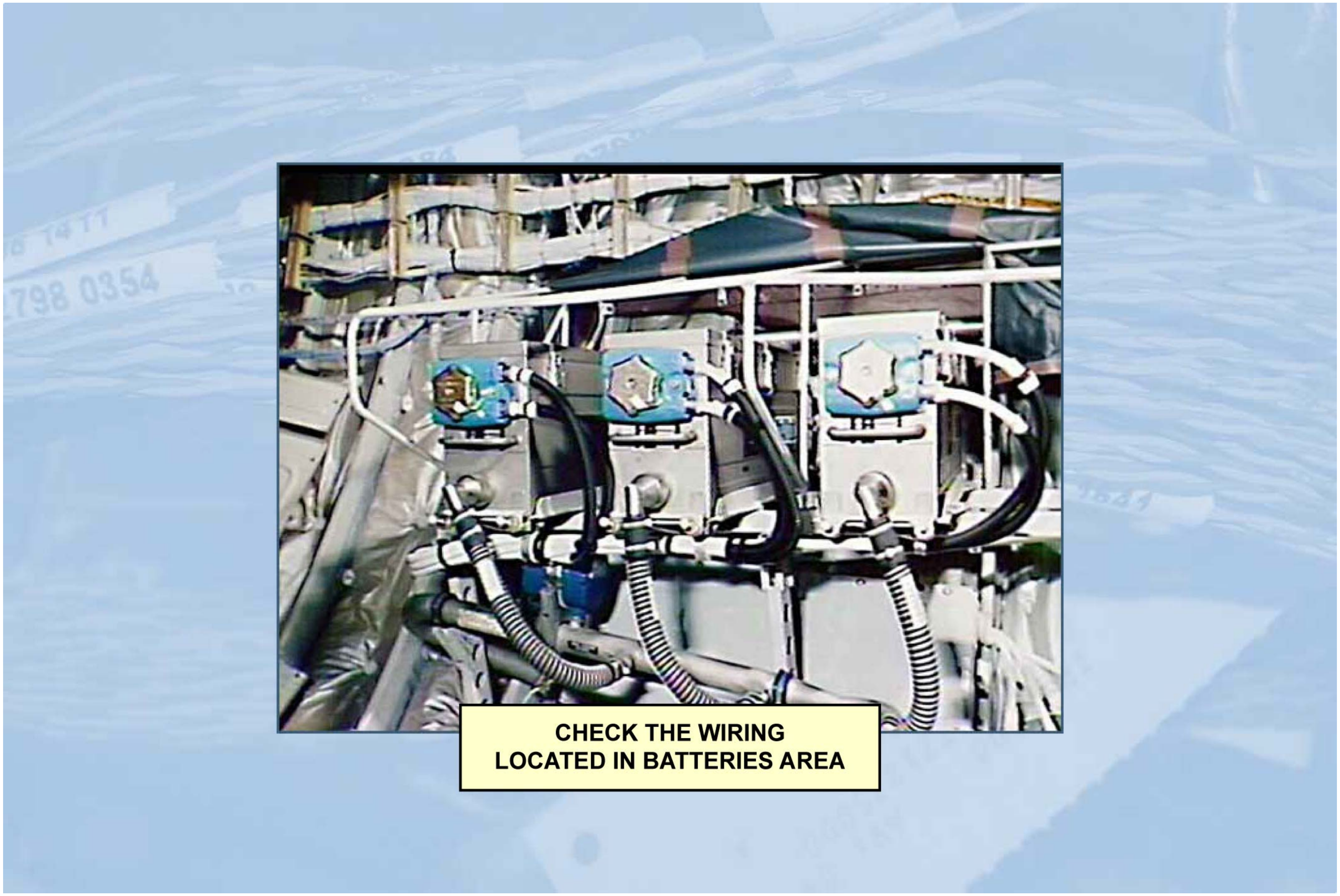

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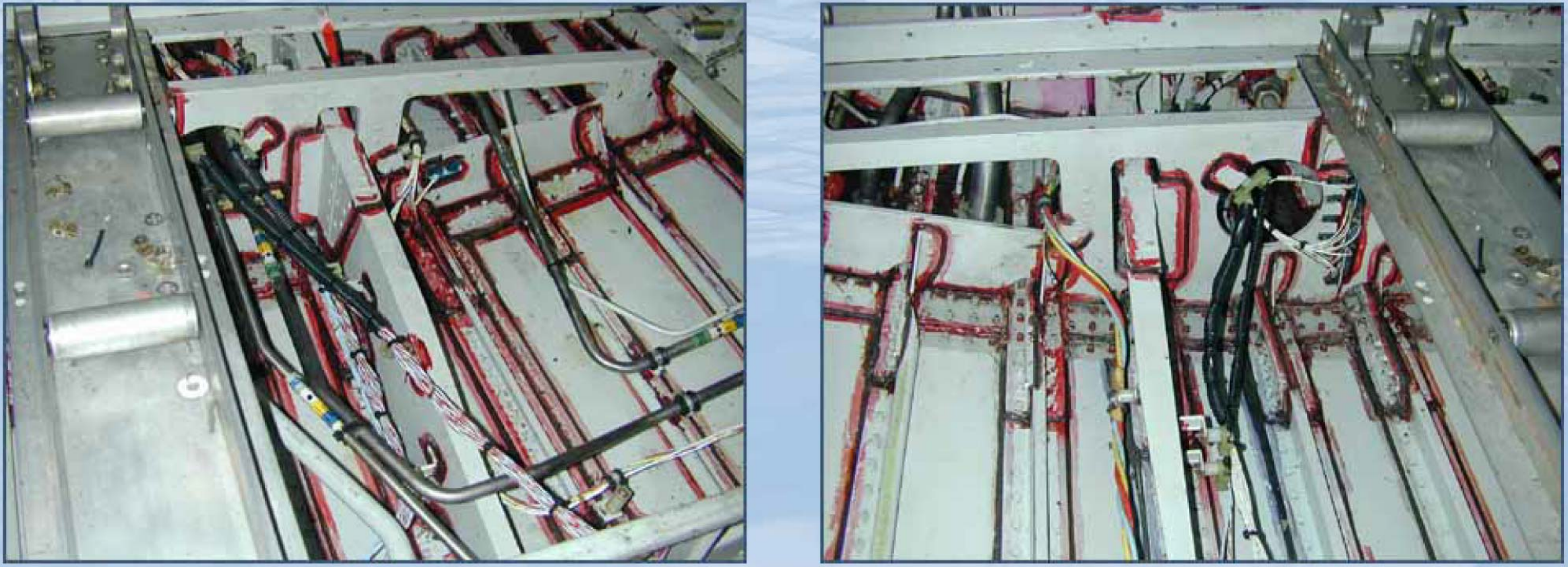

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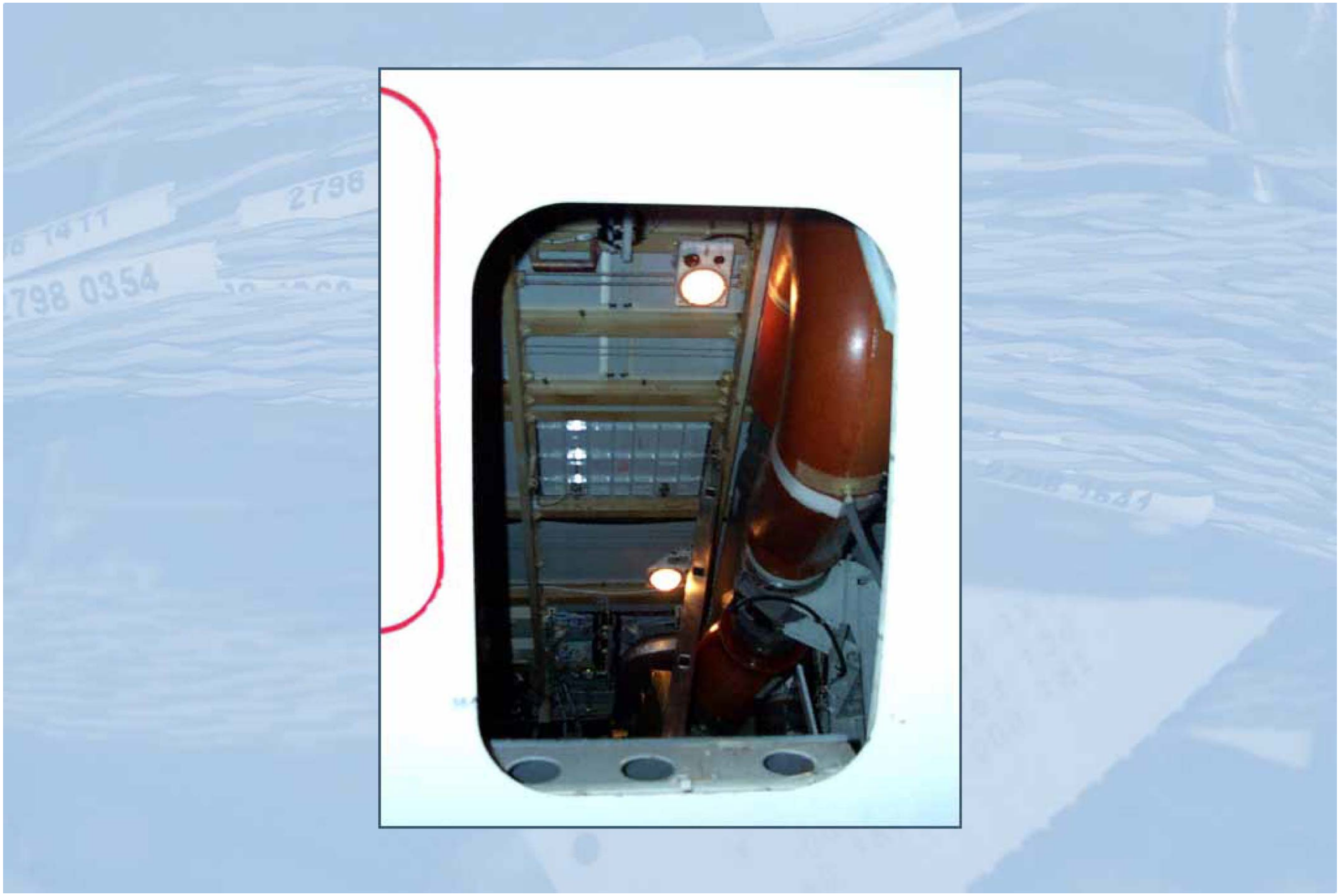

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ZONAL AREAS OF INSPECTION

ZONAL AREAS OF INSPECTION

ZONAL AREAS OF INSPECTION

WIRING SYSTEM DAMAGE

WIRING SYSTEM DAMAGE

This module shows you how to recognize typical wiring system damage.

WIRING SYSTEM DAMAGE

WIRING SYSTEM DAMAGE

WIRING SYSTEM DAMAGE (continued)

VIBRATION

VIBRATION
VIBRATION
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WIRING SYSTEM DAMAGE - VIBRATION

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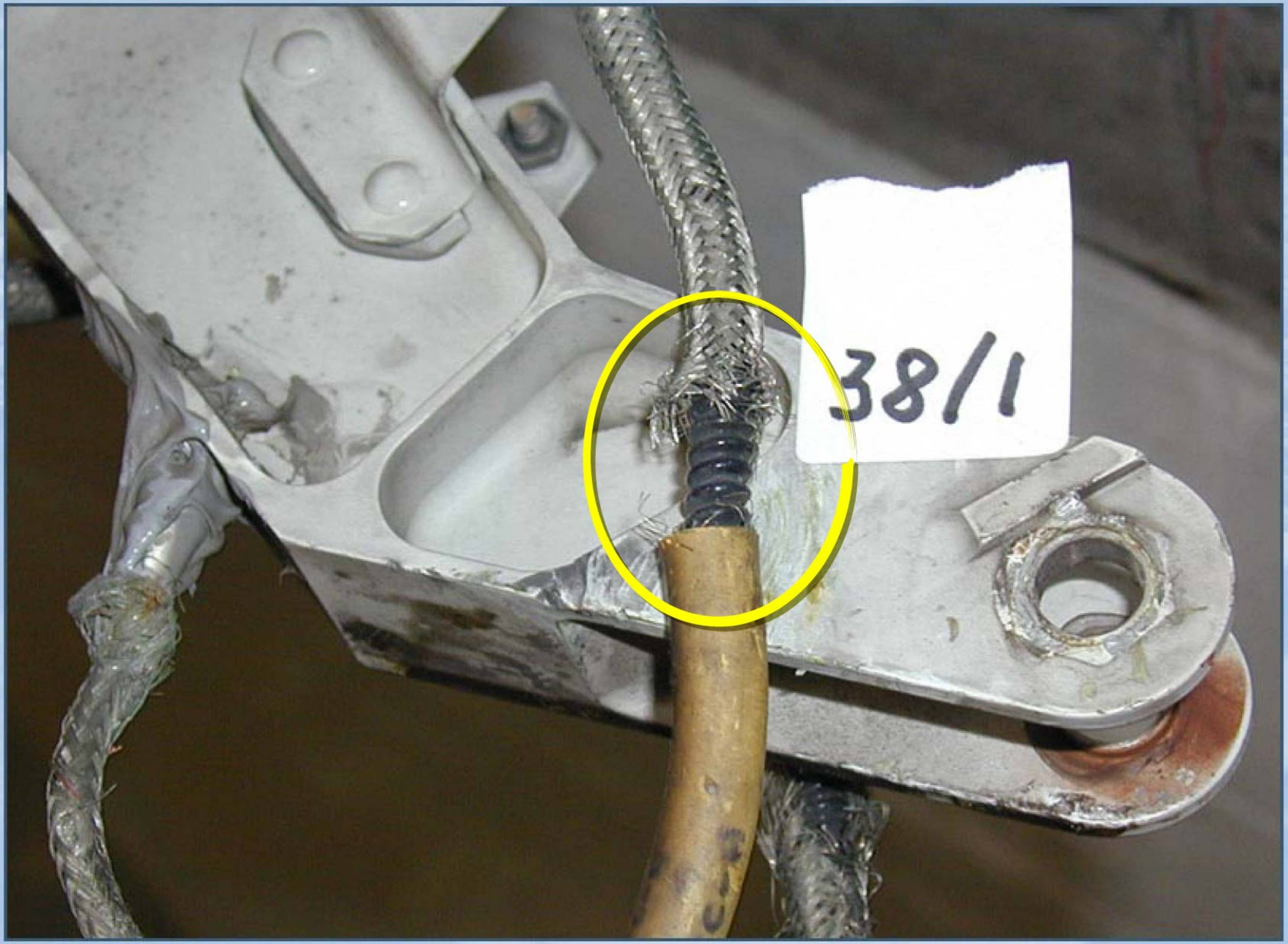
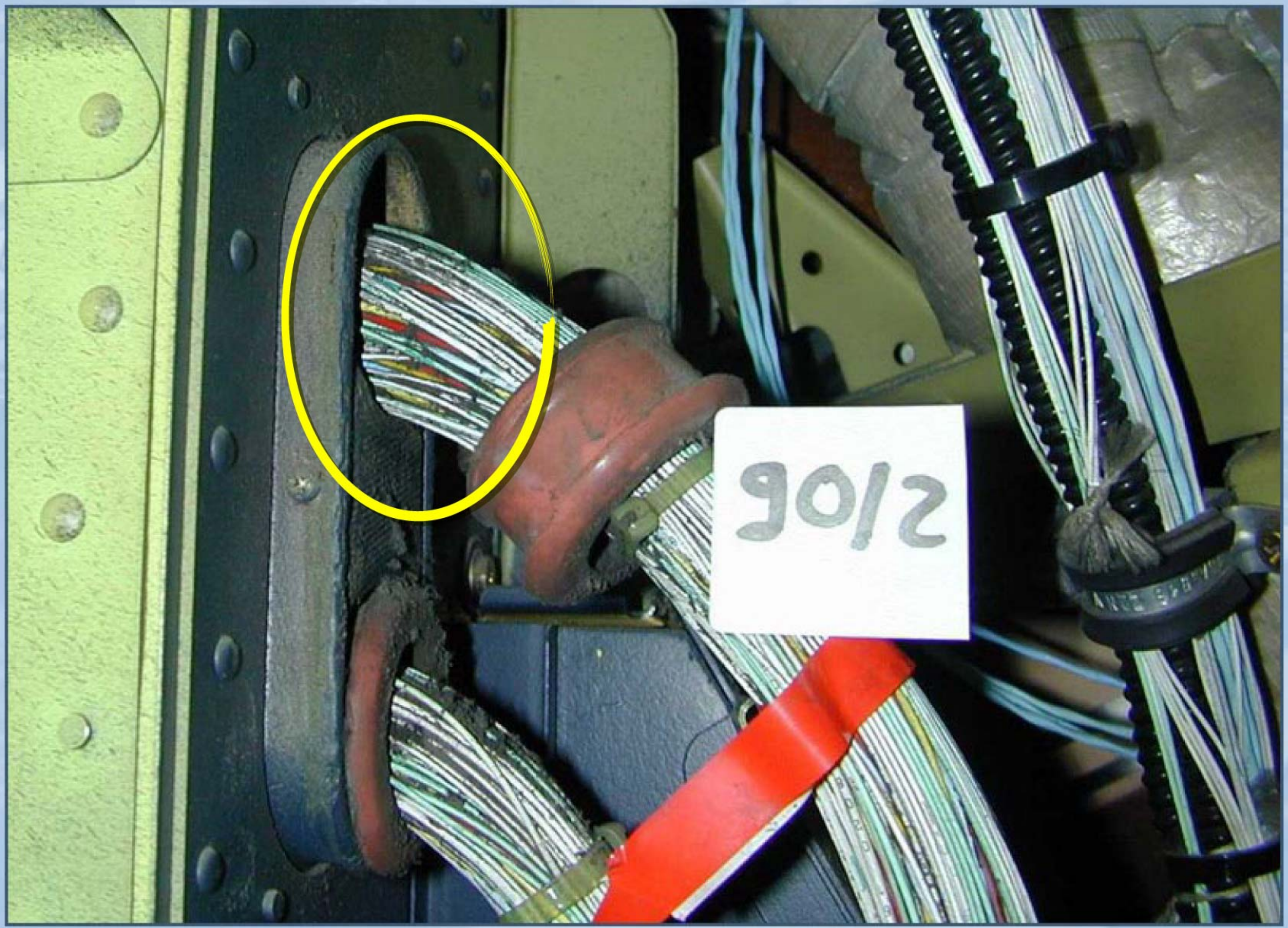
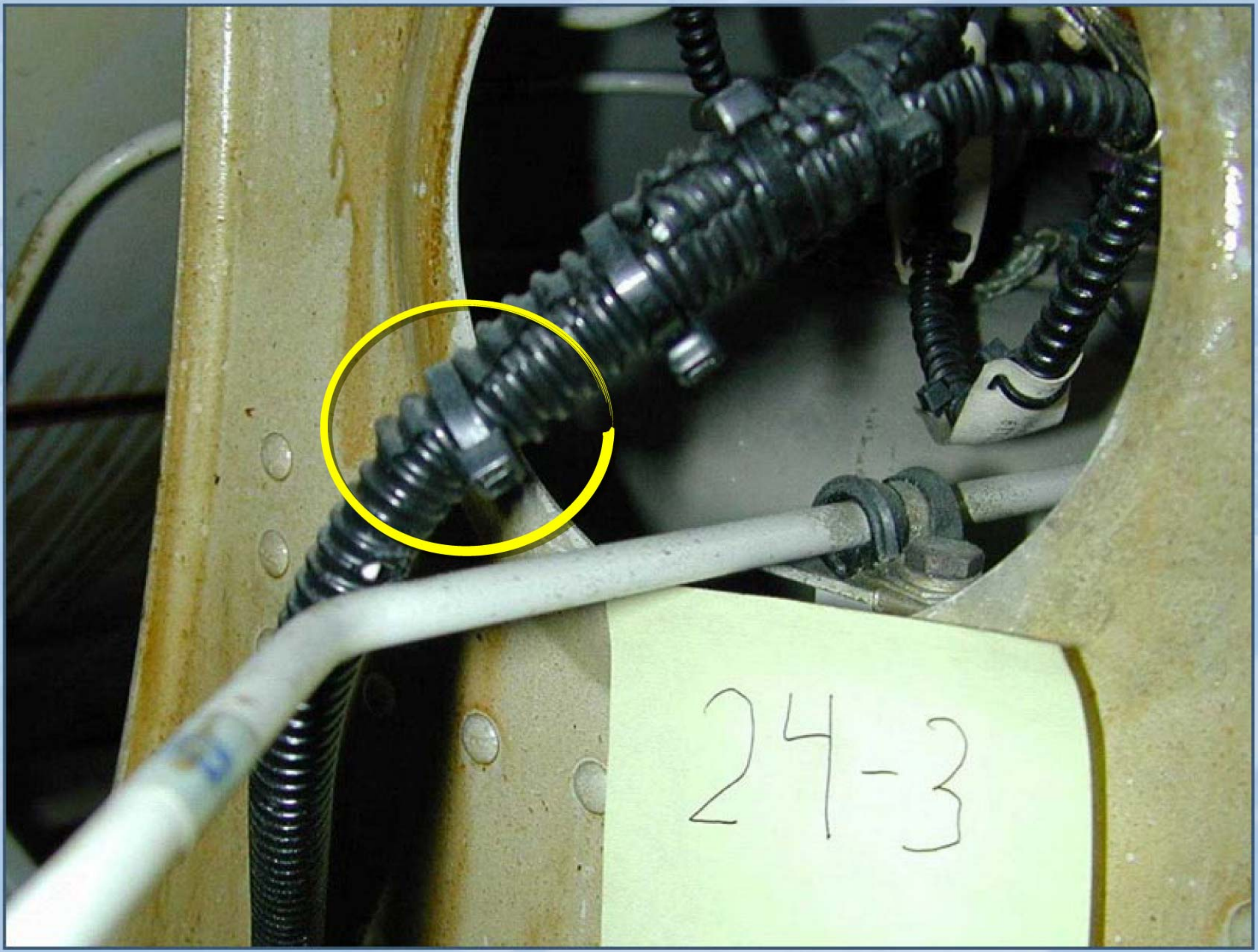


WIRING SYSTEM DAMAGE - VIBRATION

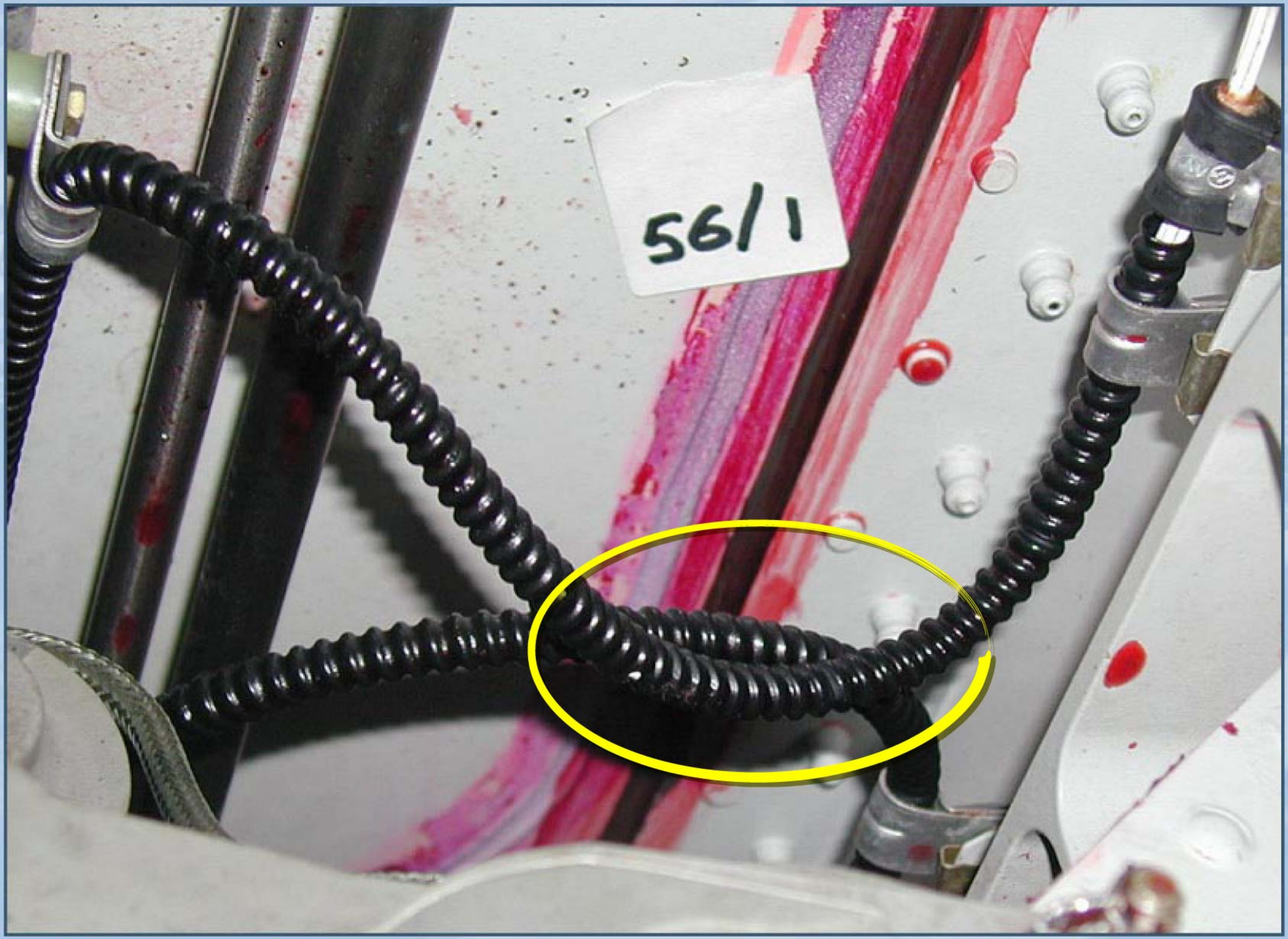


WIRING SYSTEM DAMAGE - VIBRATION



WIRING SYSTEM DAMAGE - VIBRATION

WIRING SYSTEM DAMAGE - VIBRATION



WIRING SYSTEM DAMAGE - VIBRATION

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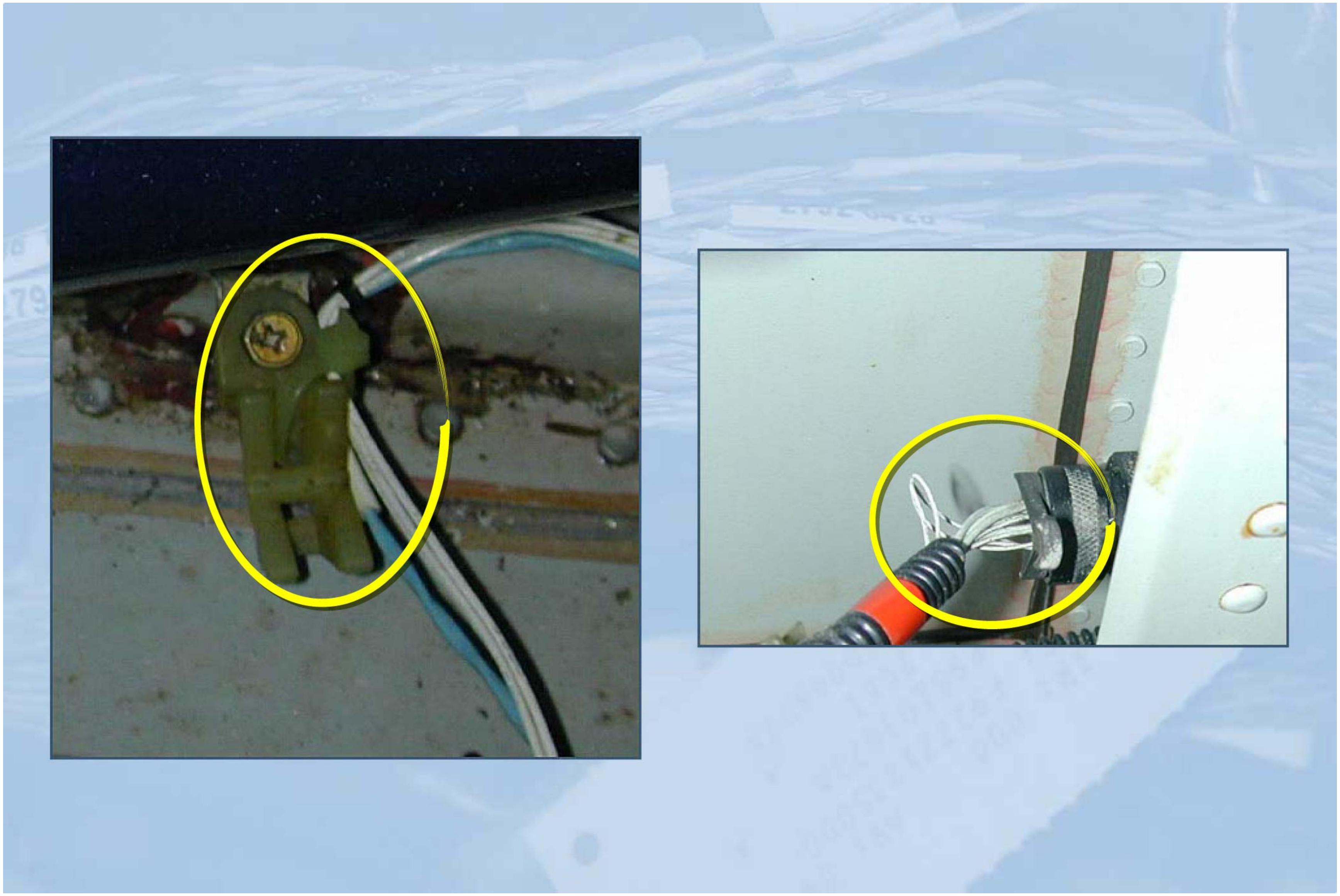
WIRING SYSTEM DAMAGE - VIBRATION



WIRING SYSTEM DAMAGE - VIBRATION

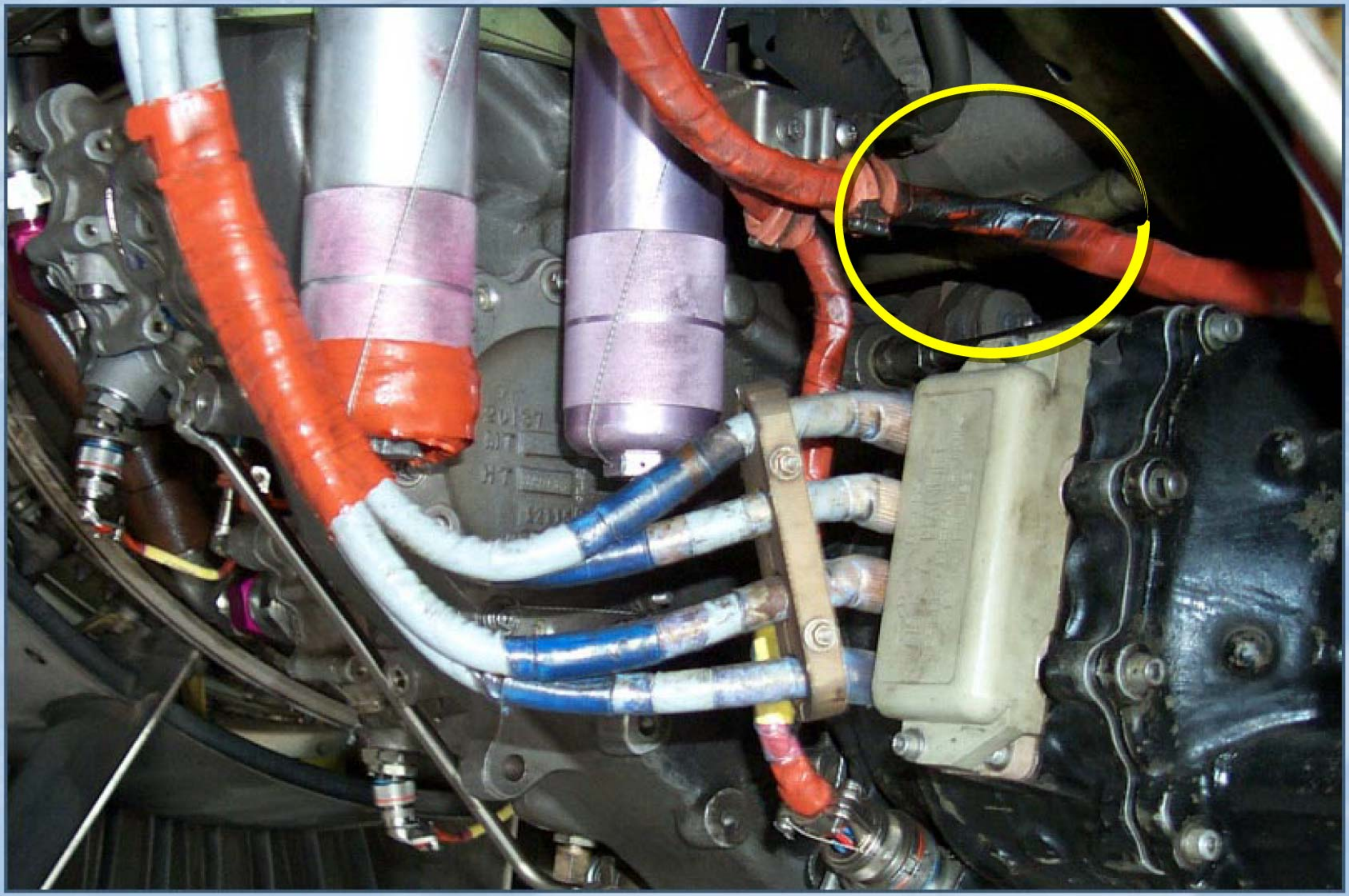
WIRING SYSTEM DAMAGE - VIBRATION

WIRING SYSTEM DAMAGE

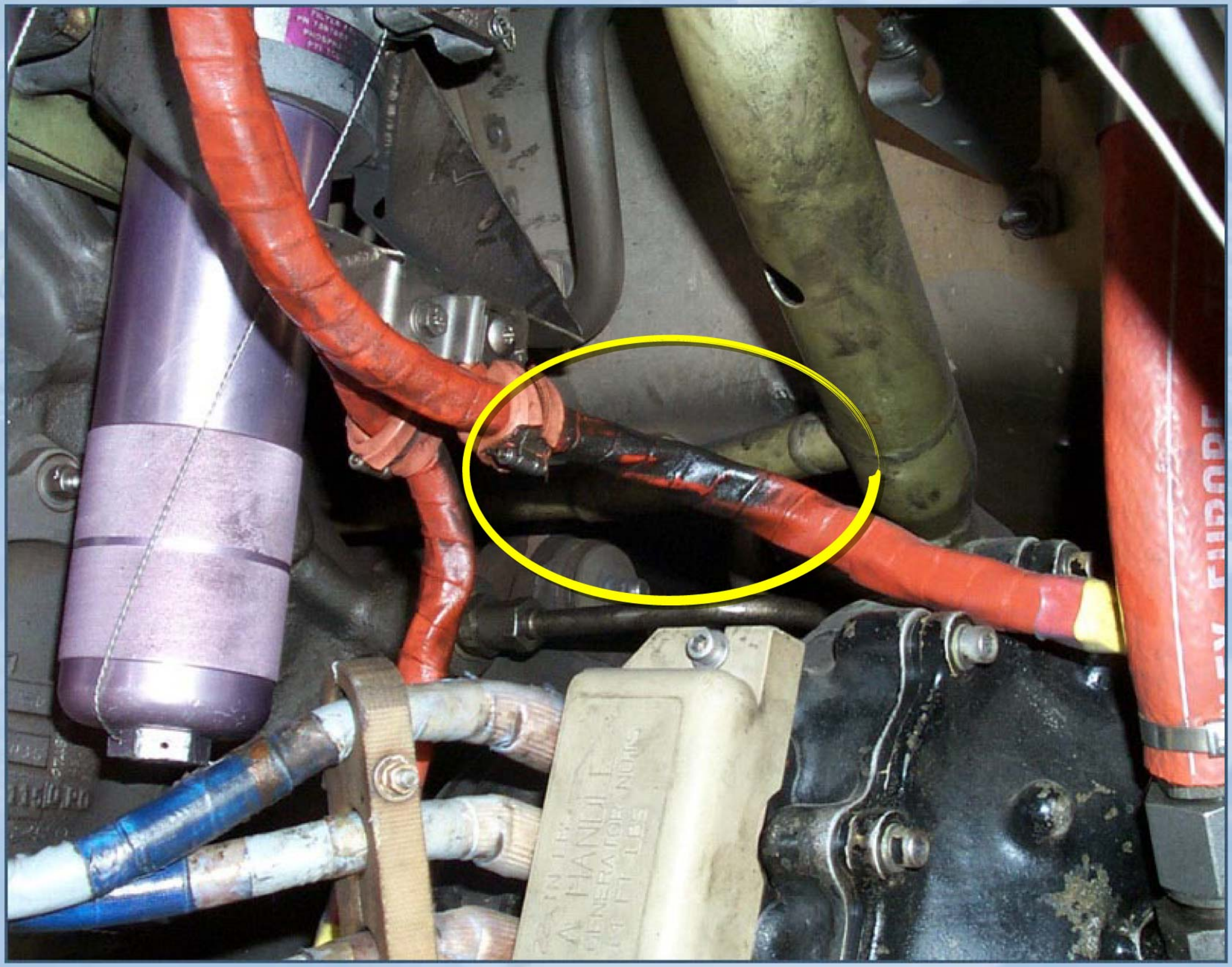
WIRING SYSTEM DAMAGE (continued)

HEAT

Damages due to heat.
HEAT



WIRING SYSTEM DAMAGE - HEAT



WIRING SYSTEM DAMAGE - HEAT

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WIRING SYSTEM DAMAGE

WIRING SYSTEM DAMAGE (continued)

CHEMICAL

CHEMICAL CONTAMINATION.
CHEMICAL CONTAMINATION.
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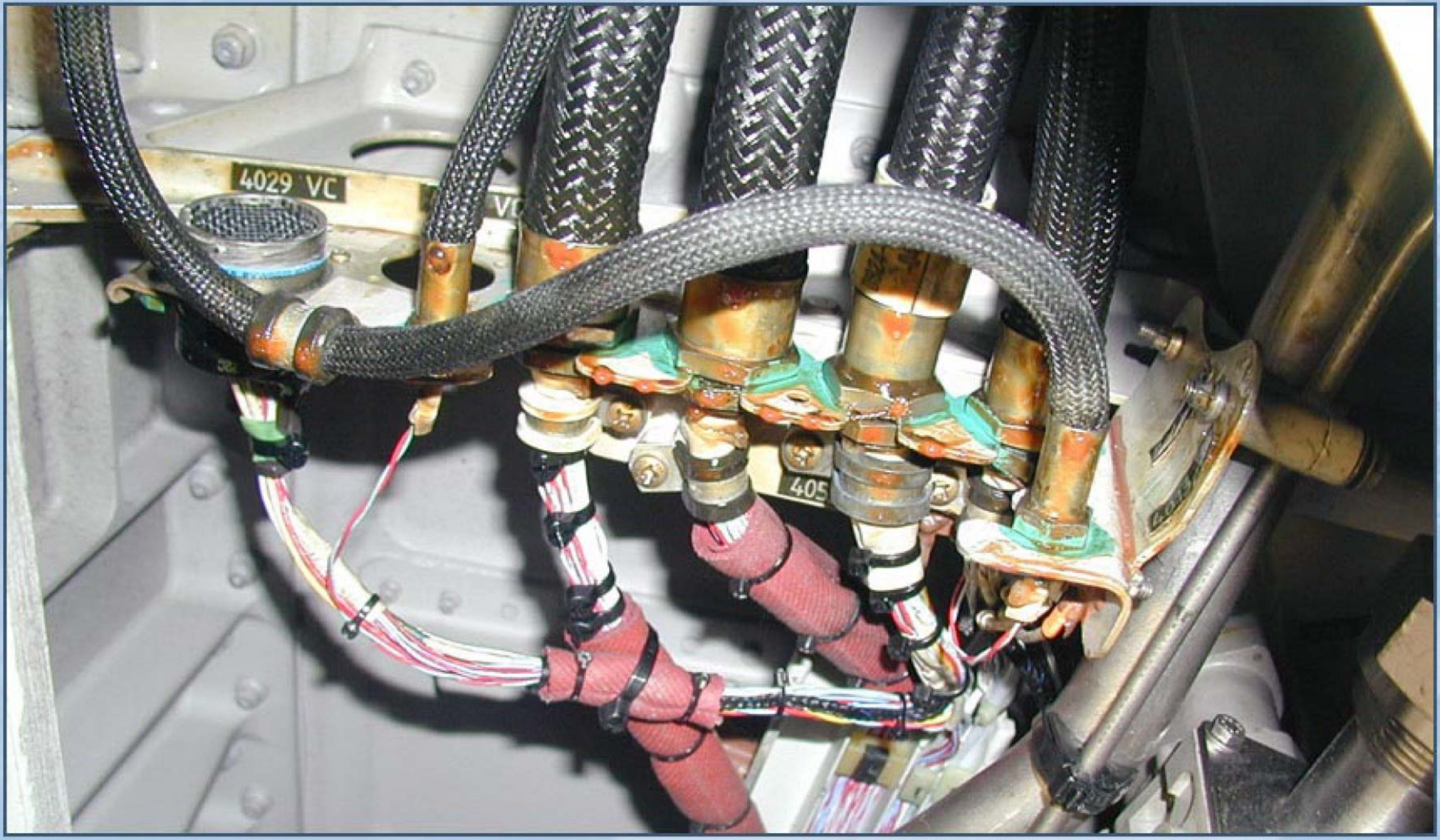
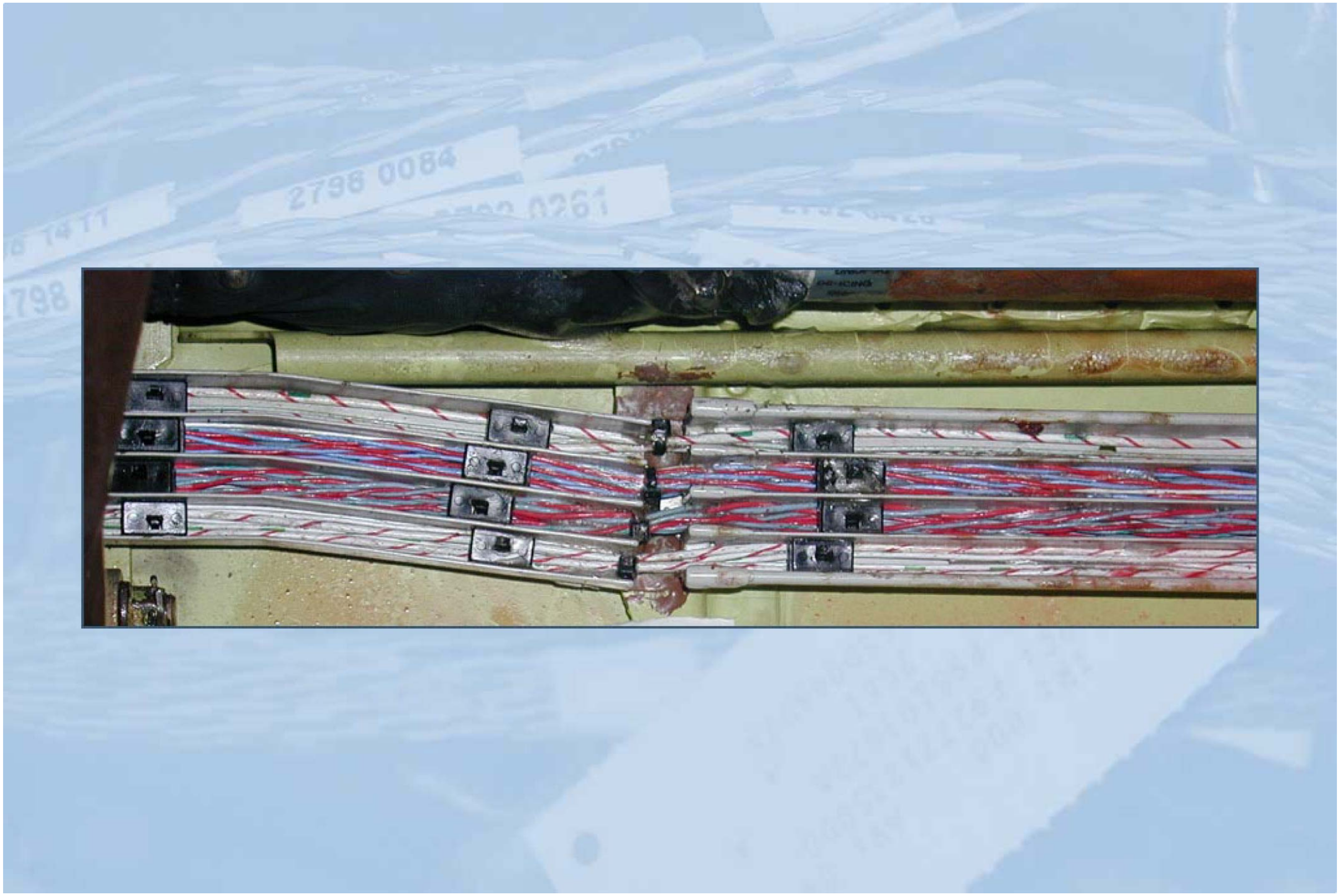
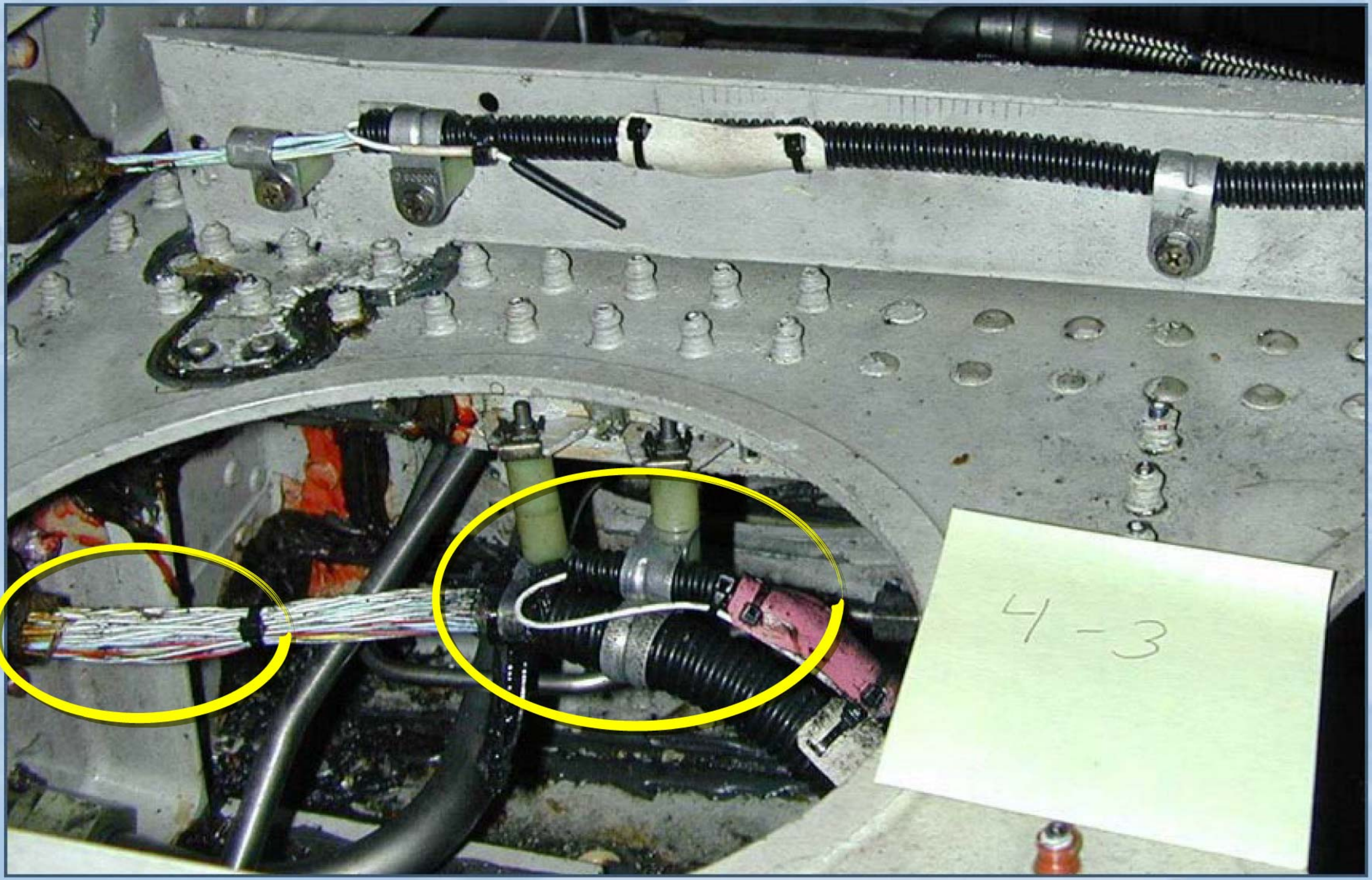


WIRING SYSTEM DAMAGE - CHEMICAL

X8U08481 - X0332T0 - XM2016000000001



WIRING SYSTEM DAMAGE - CHEMICAL



WIRING SYSTEM DAMAGE - CHEMICAL

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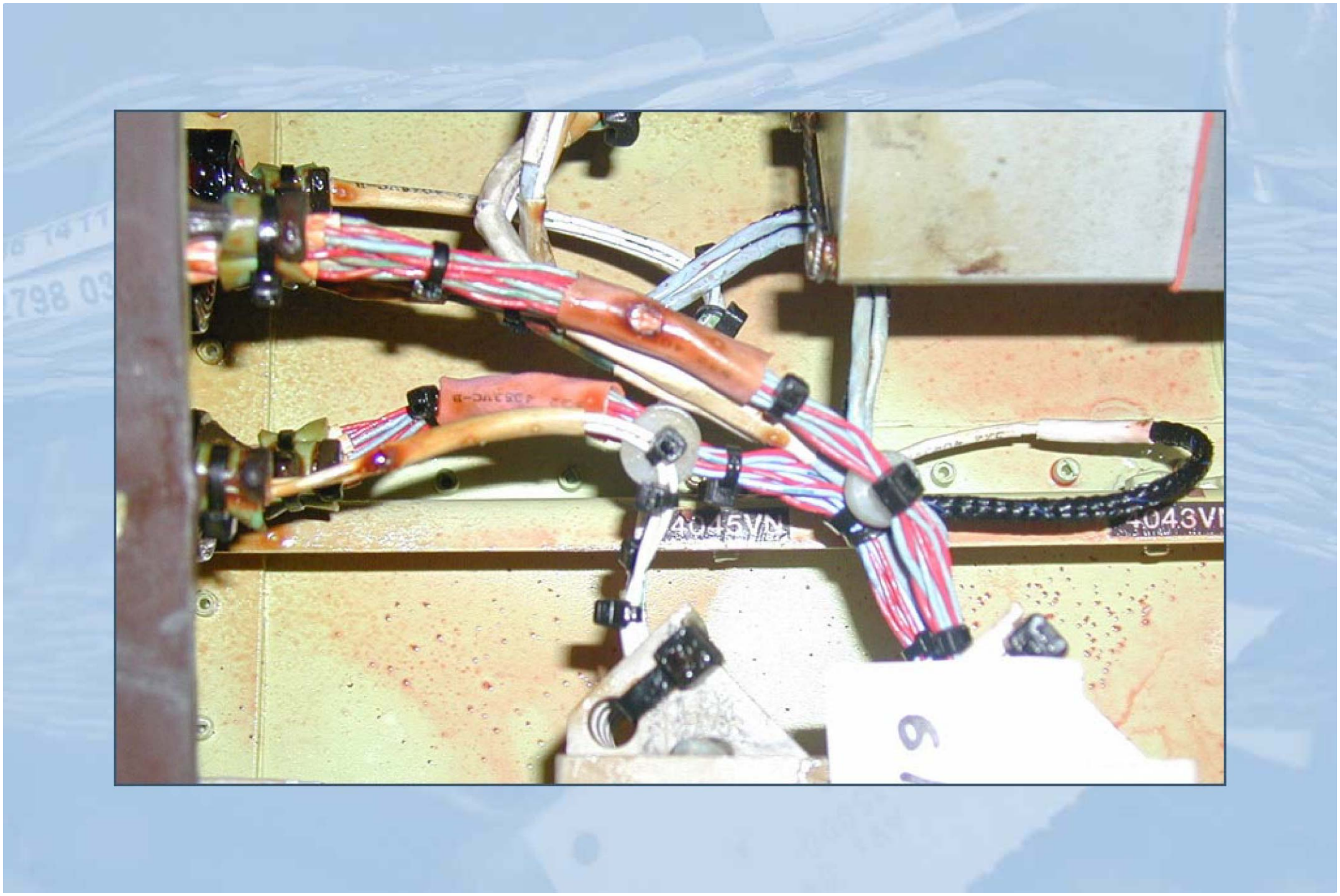

WIRING SYSTEM DAMAGE - CHEMICAL

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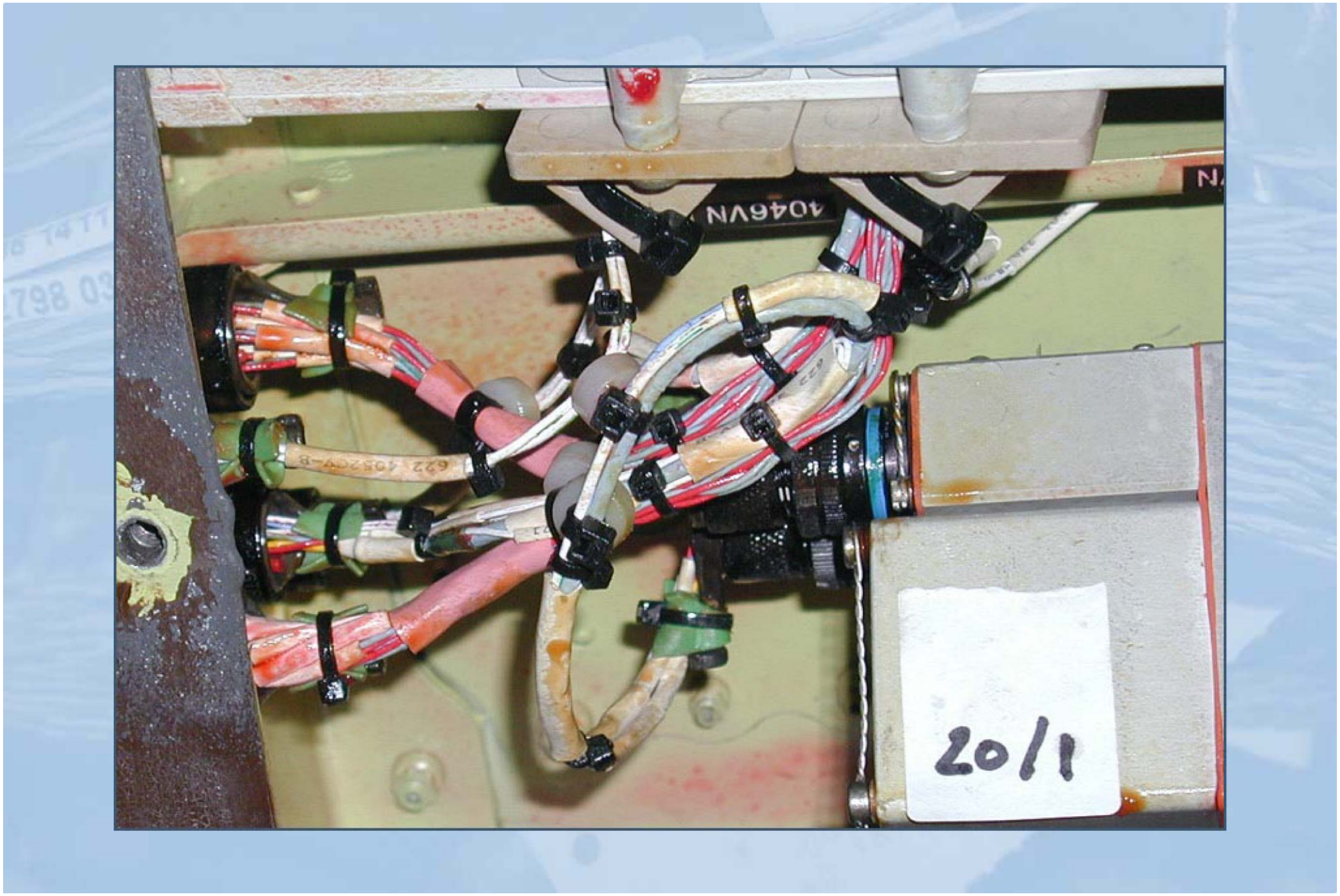

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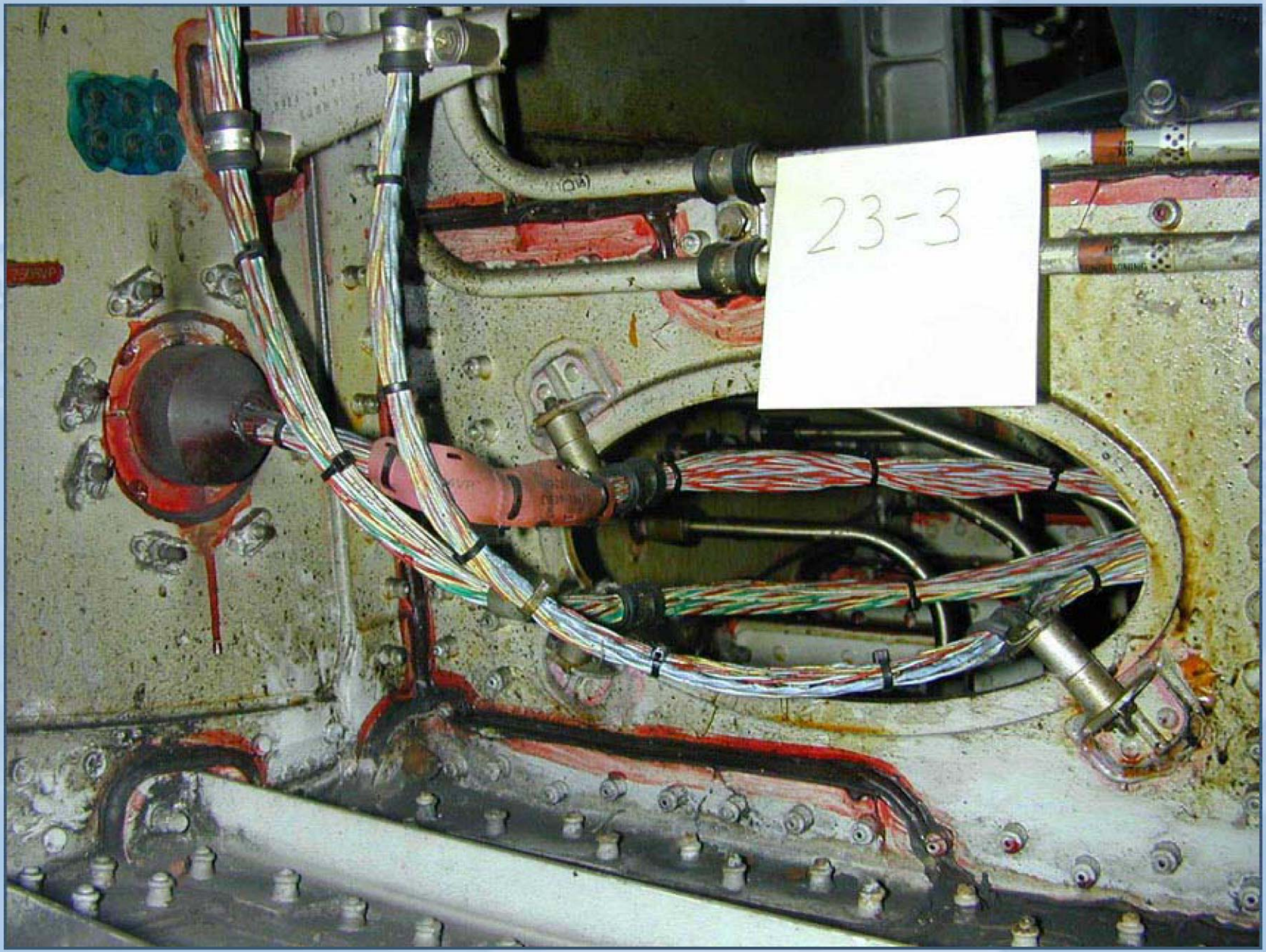

WIRING SYSTEM DAMAGE - CHEMICAL

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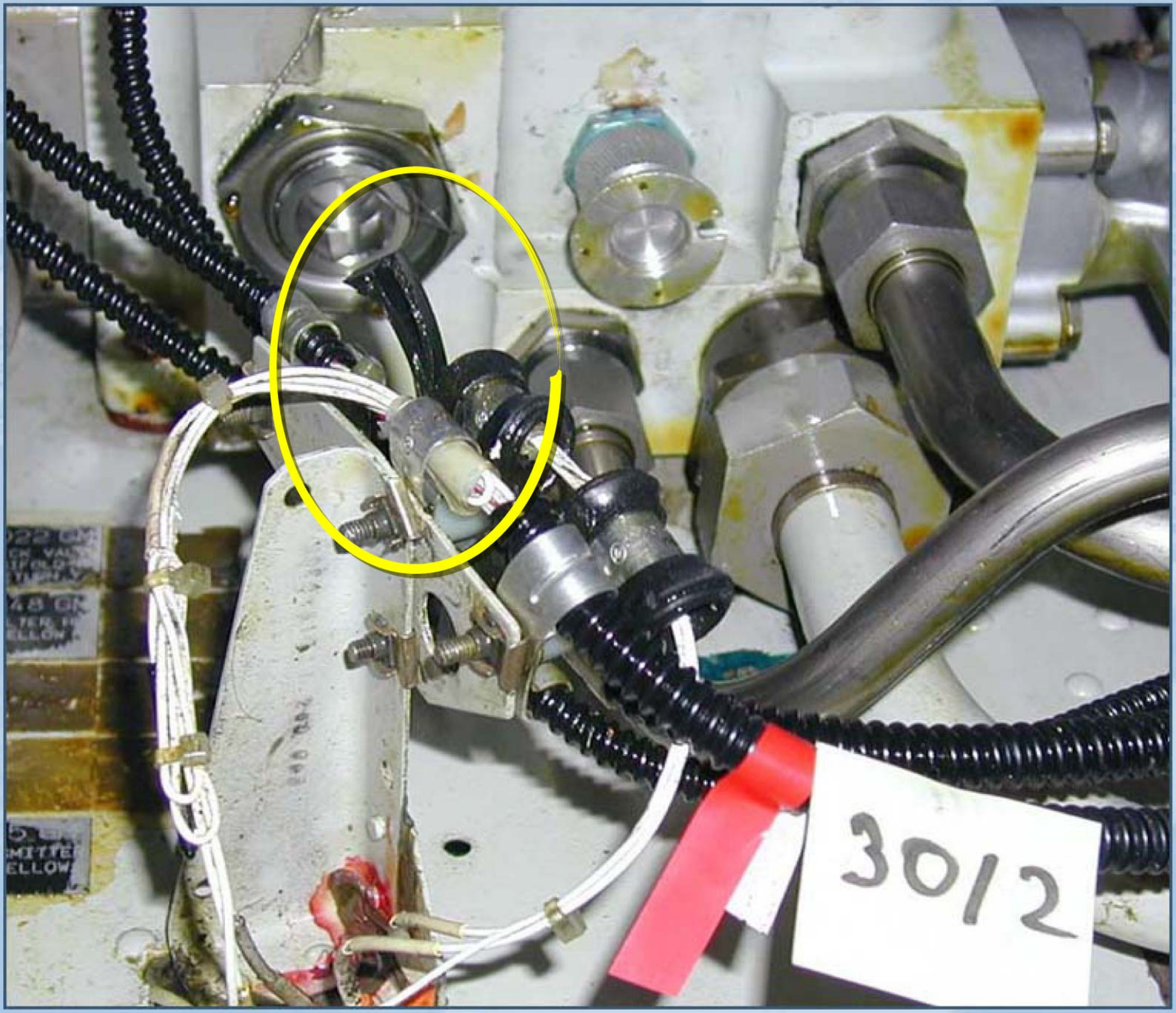

WIRING SYSTEM DAMAGE - CHEMICAL

WIRING SYSTEM DAMAGE

WIRING SYSTEM DAMAGE (continued)

INDIRECT DAMAGES

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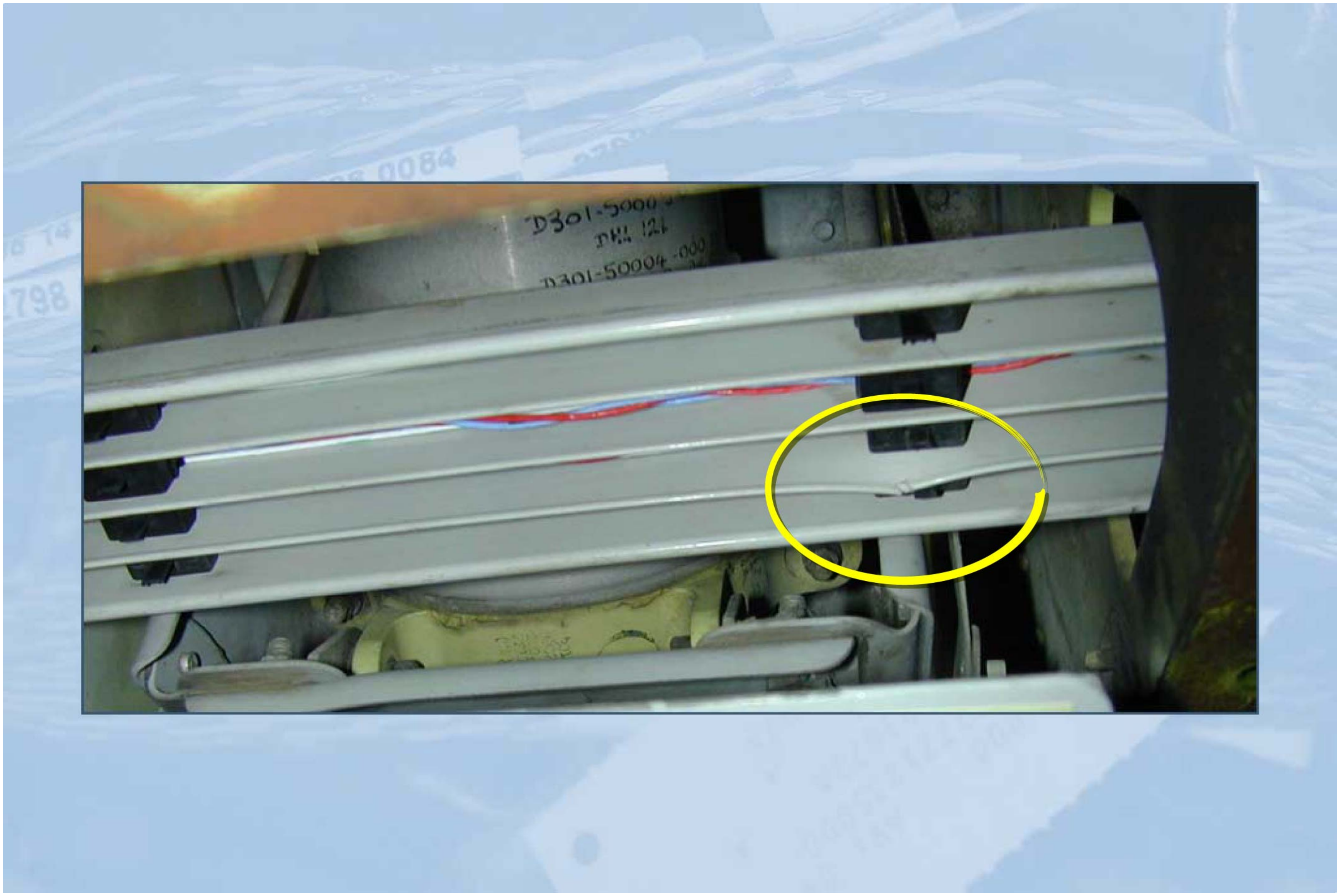

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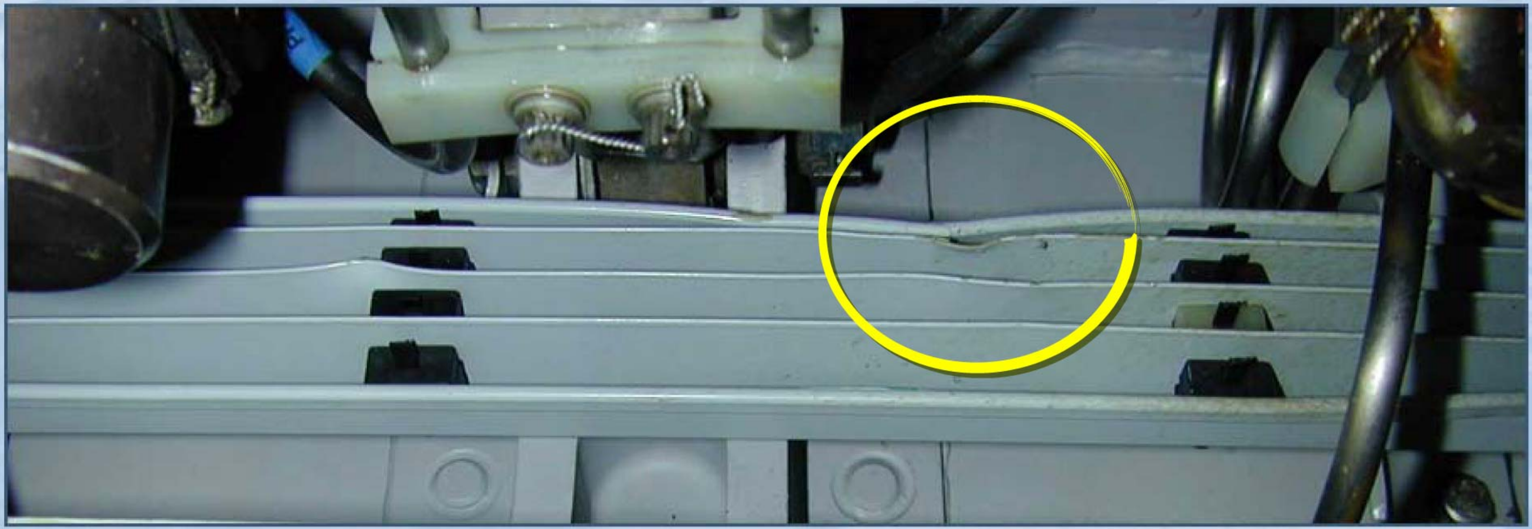

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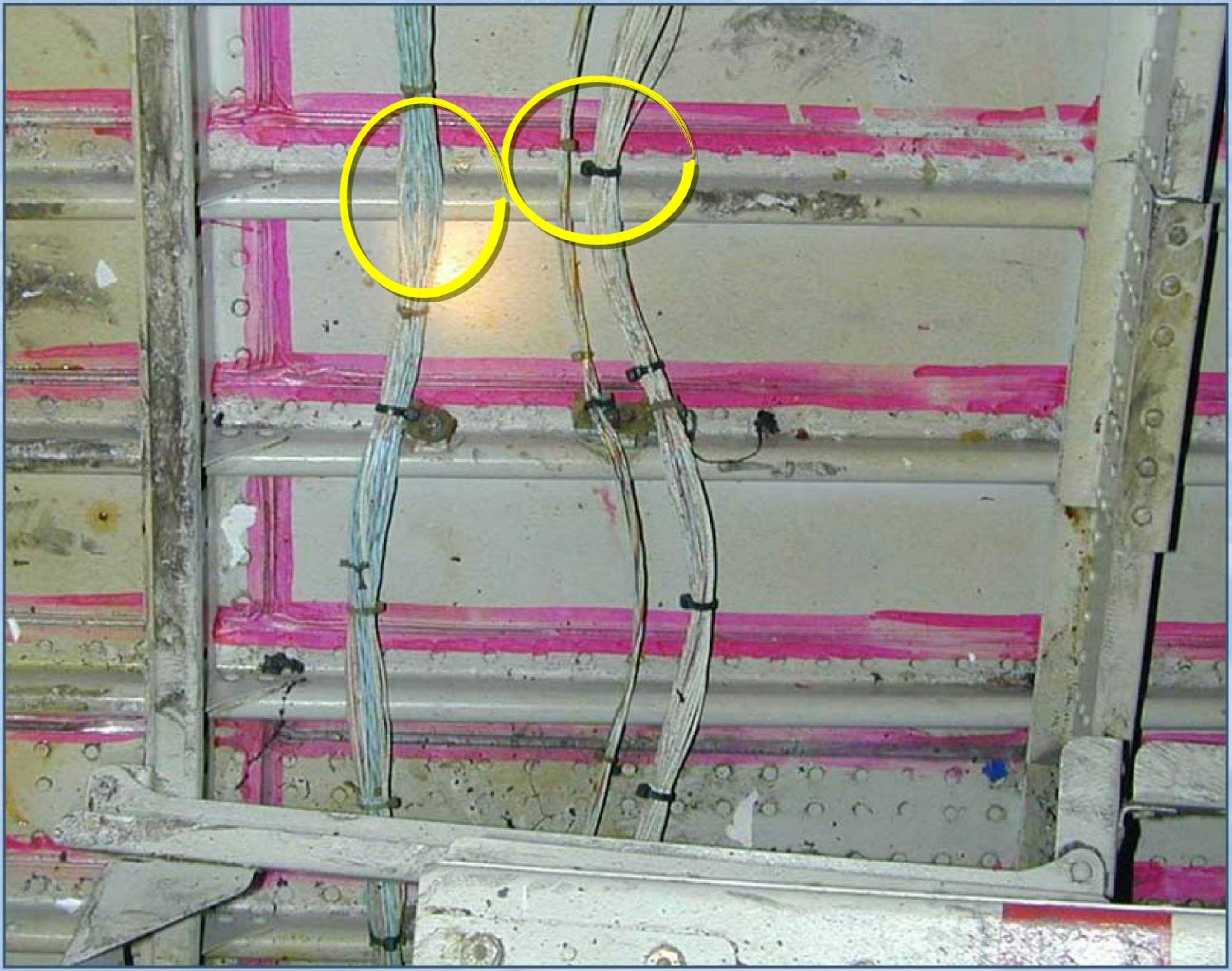

WIRING SYSTEM DAMAGE - INDIRECT DAMAGES

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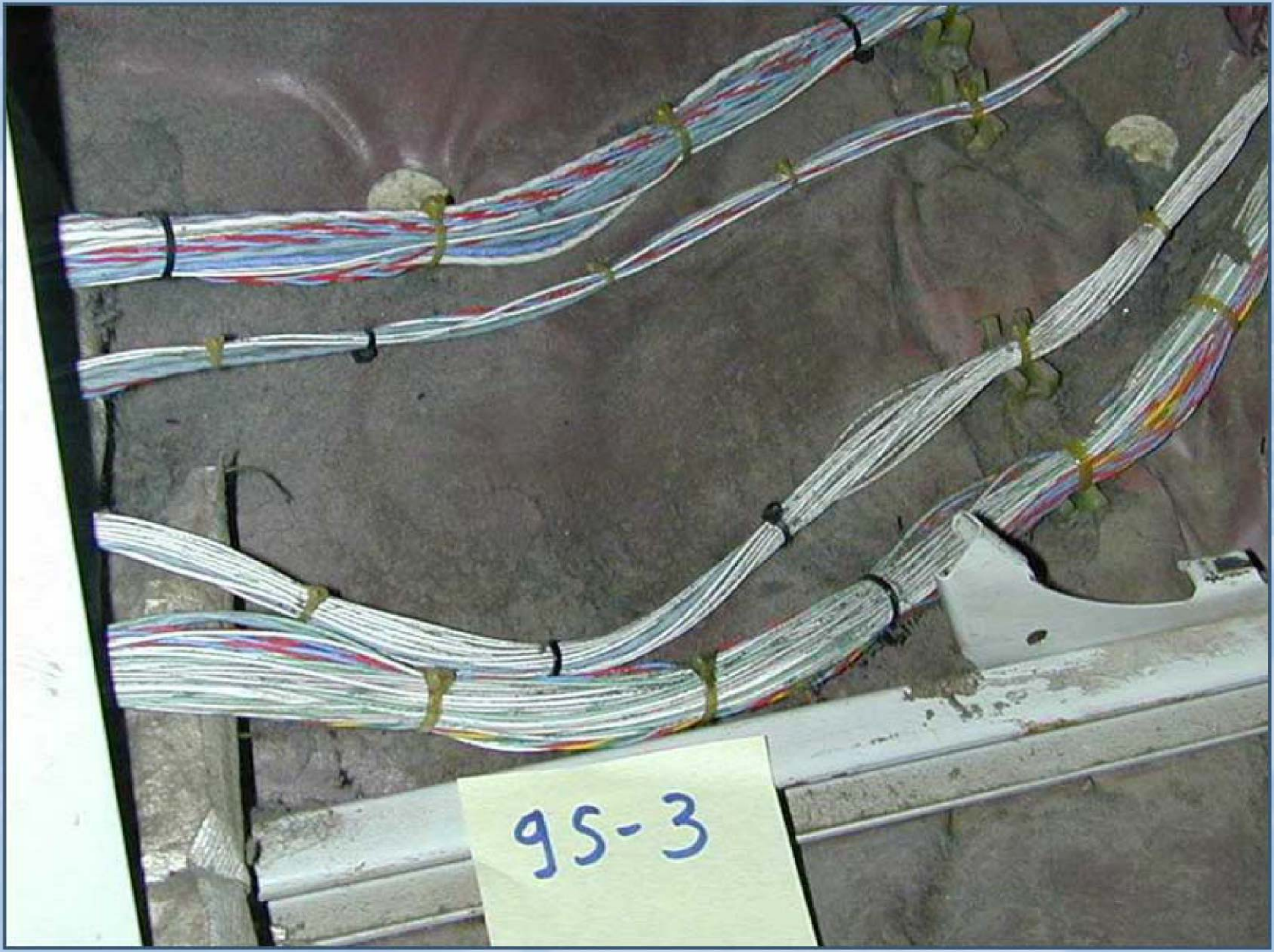

WIRING SYSTEM DAMAGE - INDIRECT DAMAGES

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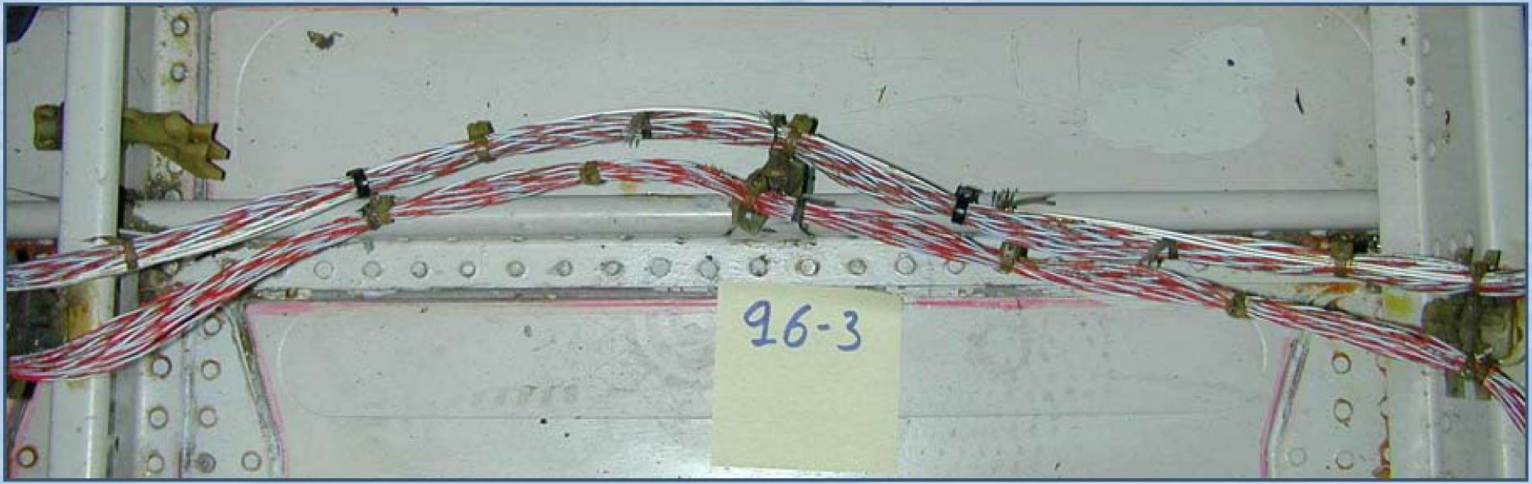

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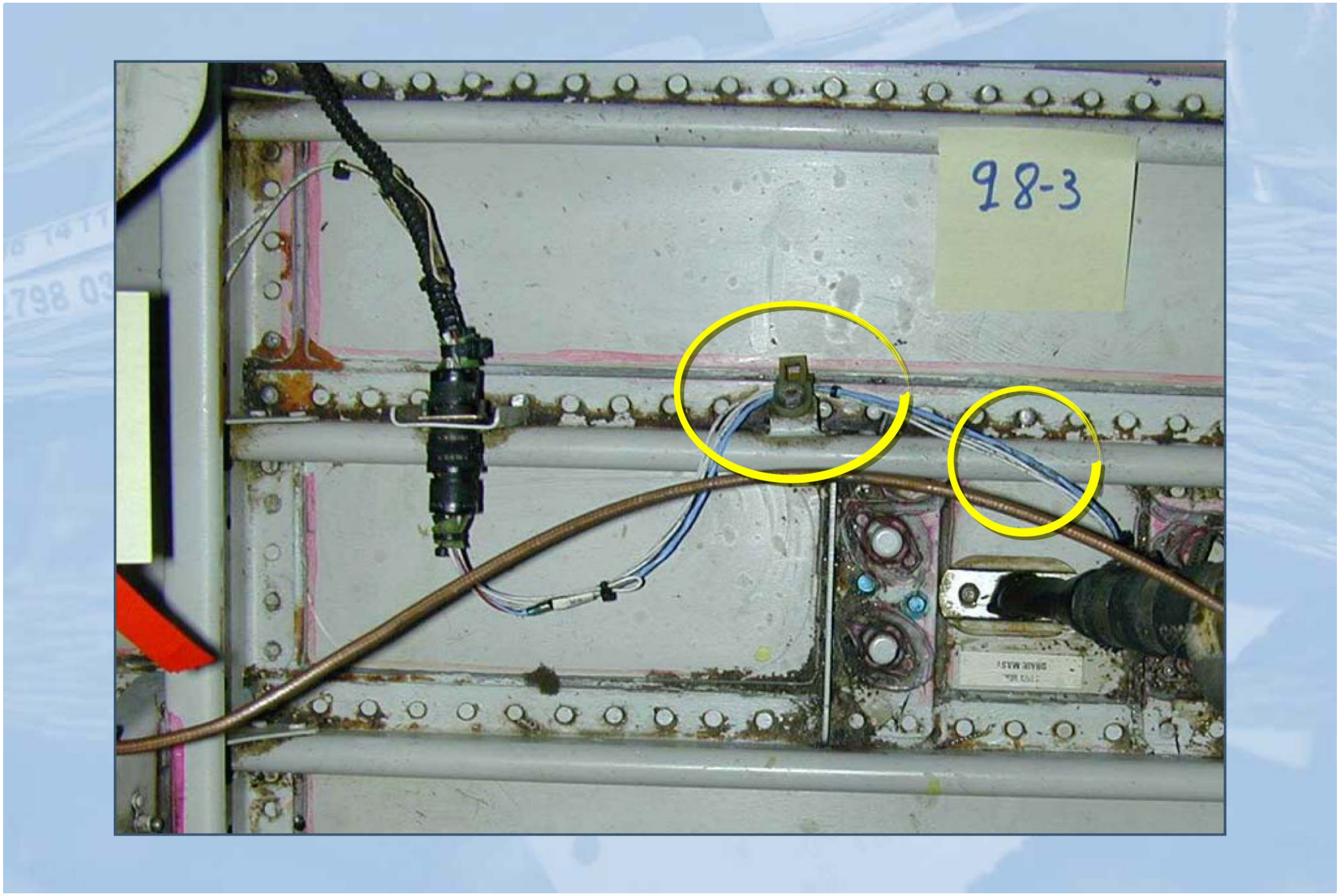

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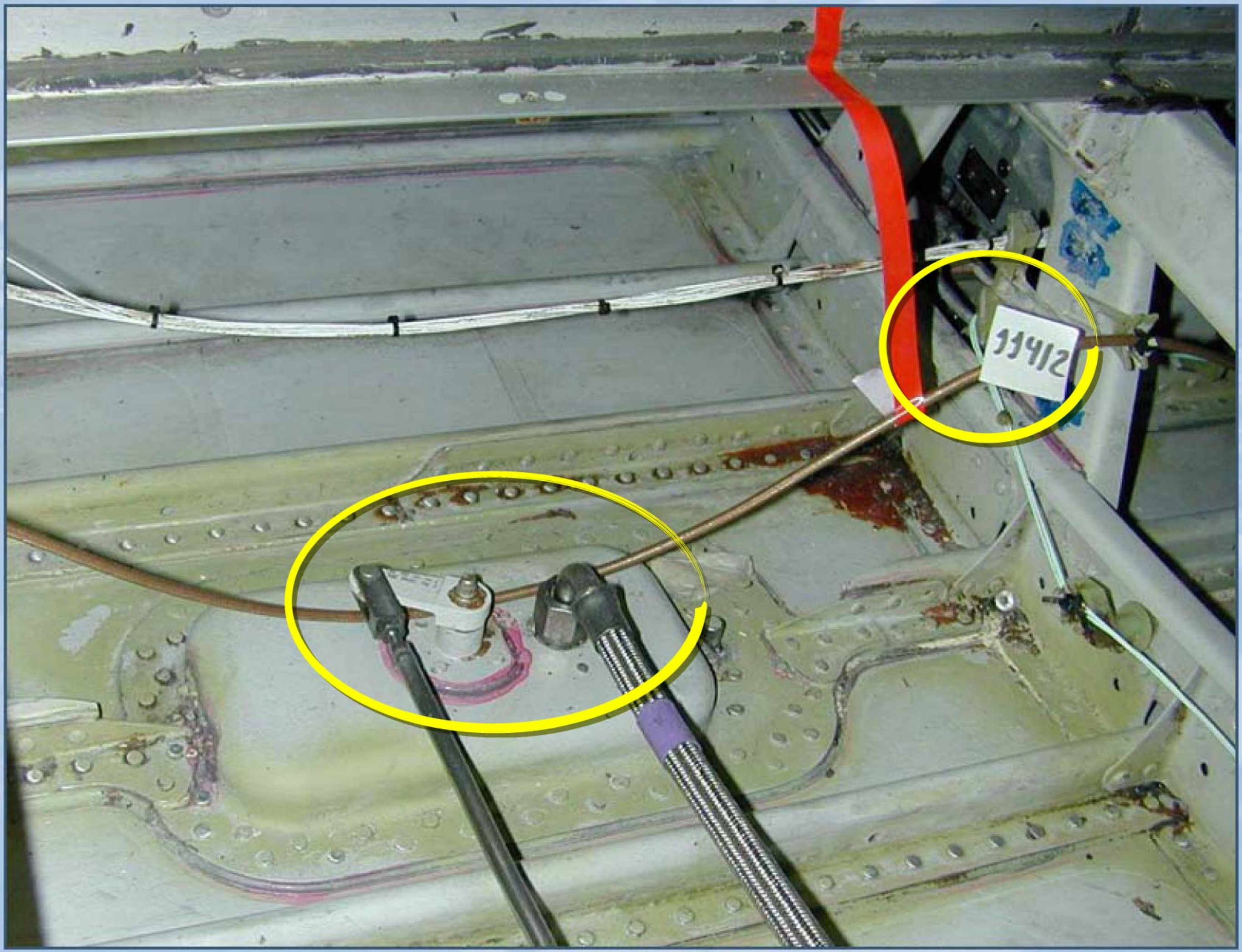

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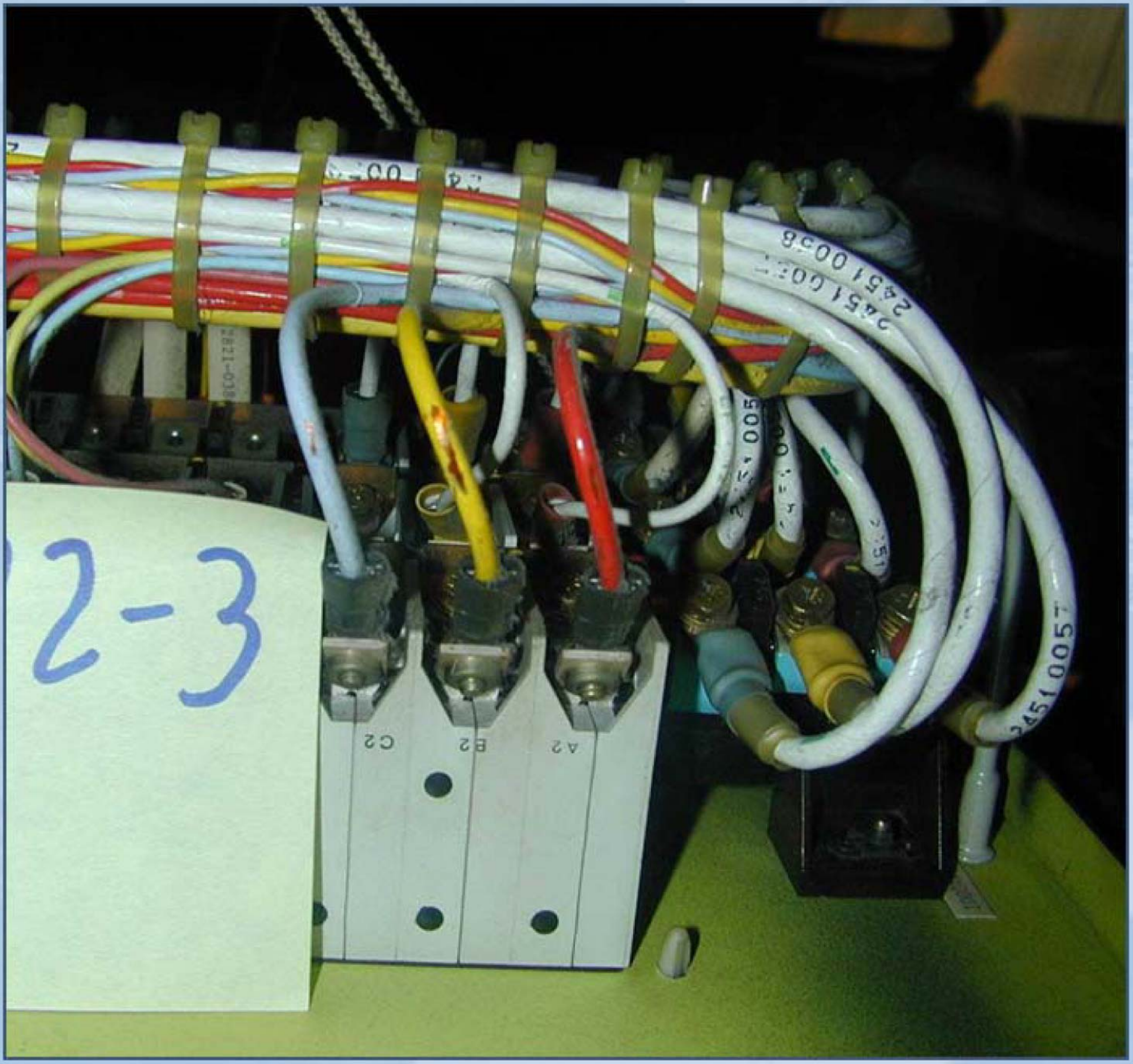

WIRING SYSTEM DAMAGE - INDIRECT DAMAGES

WIRING SYSTEM DAMAGE

WIRING SYSTEM DAMAGE (continued)

MAINTENANCE

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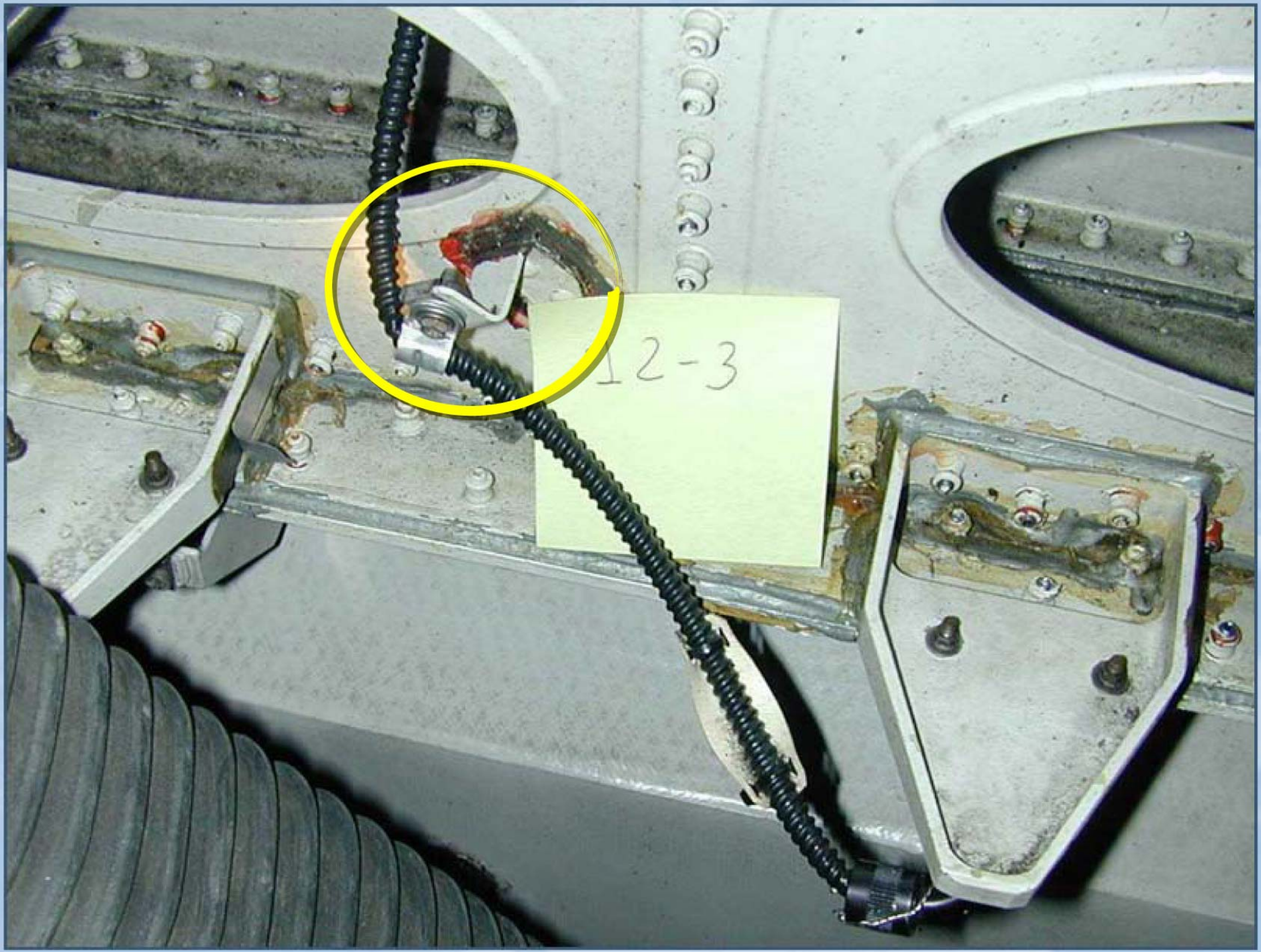

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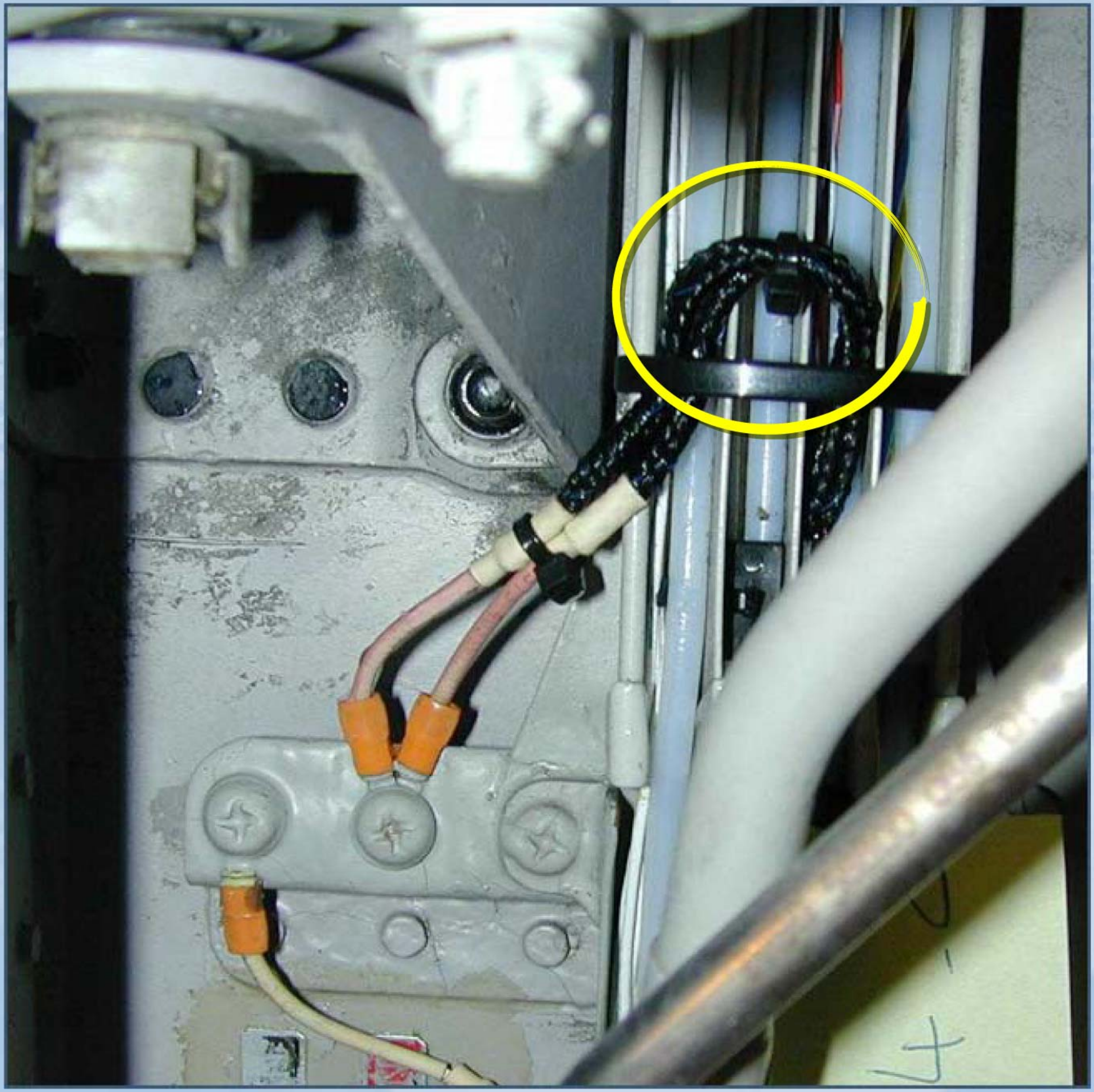

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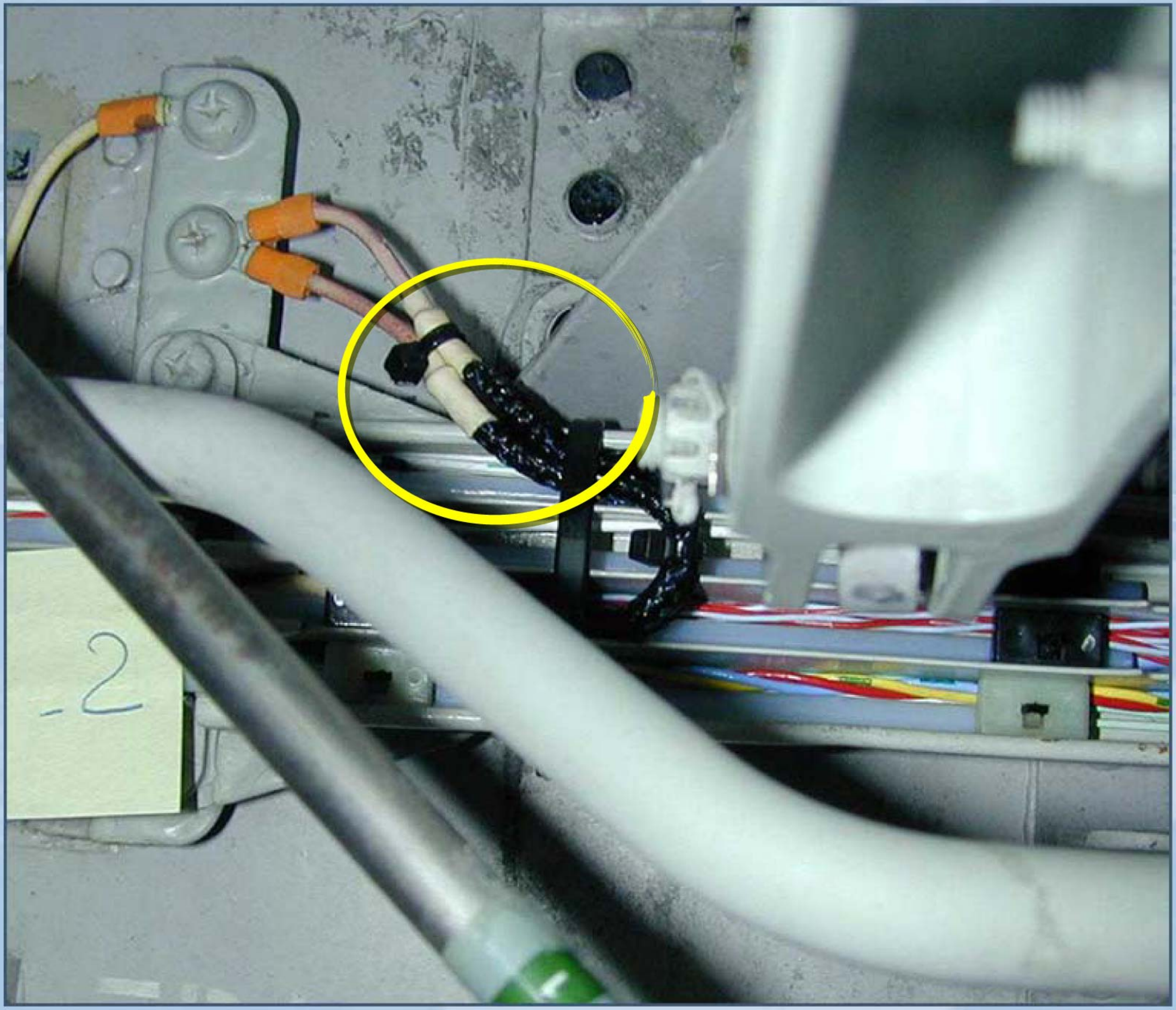

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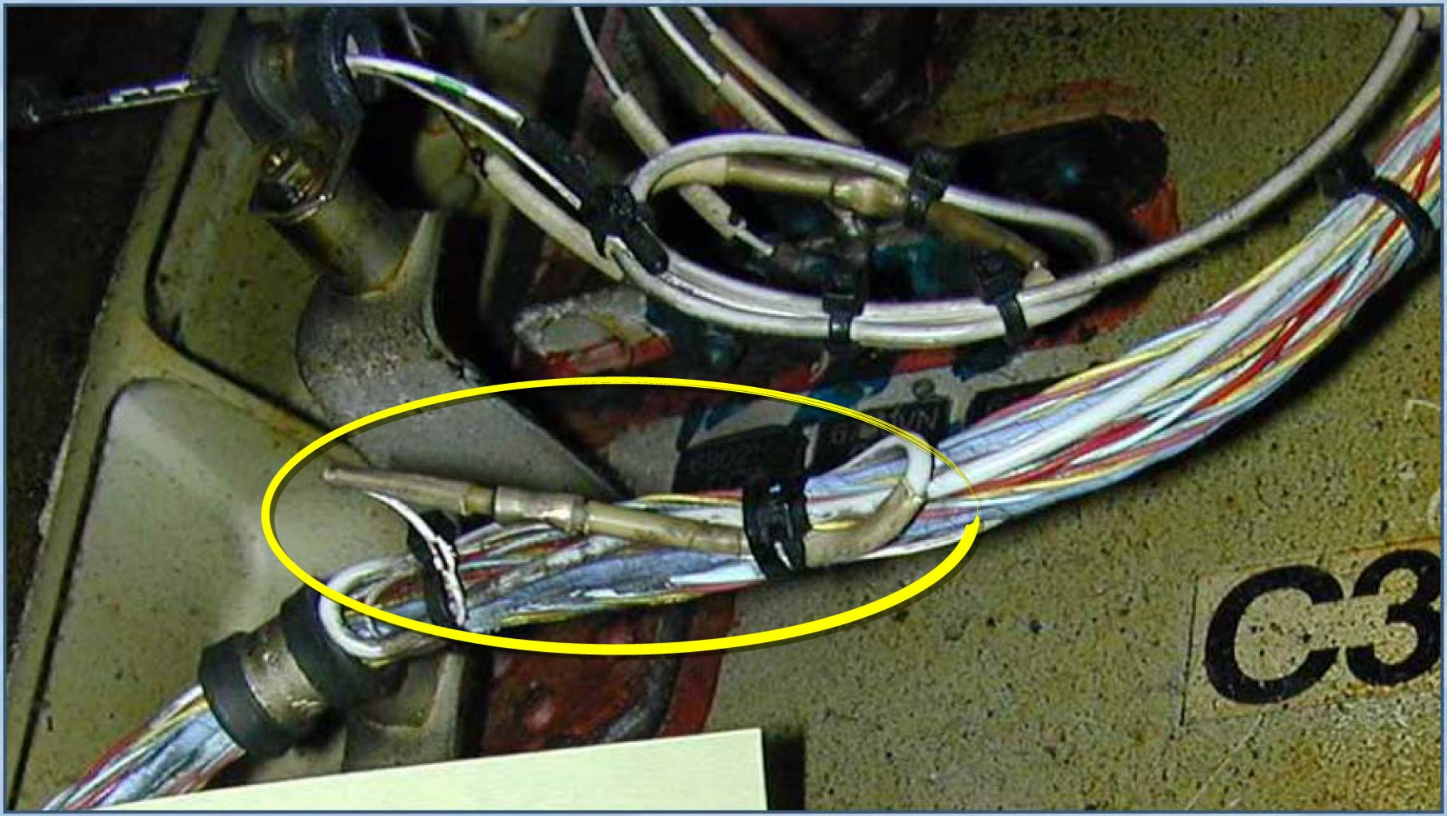

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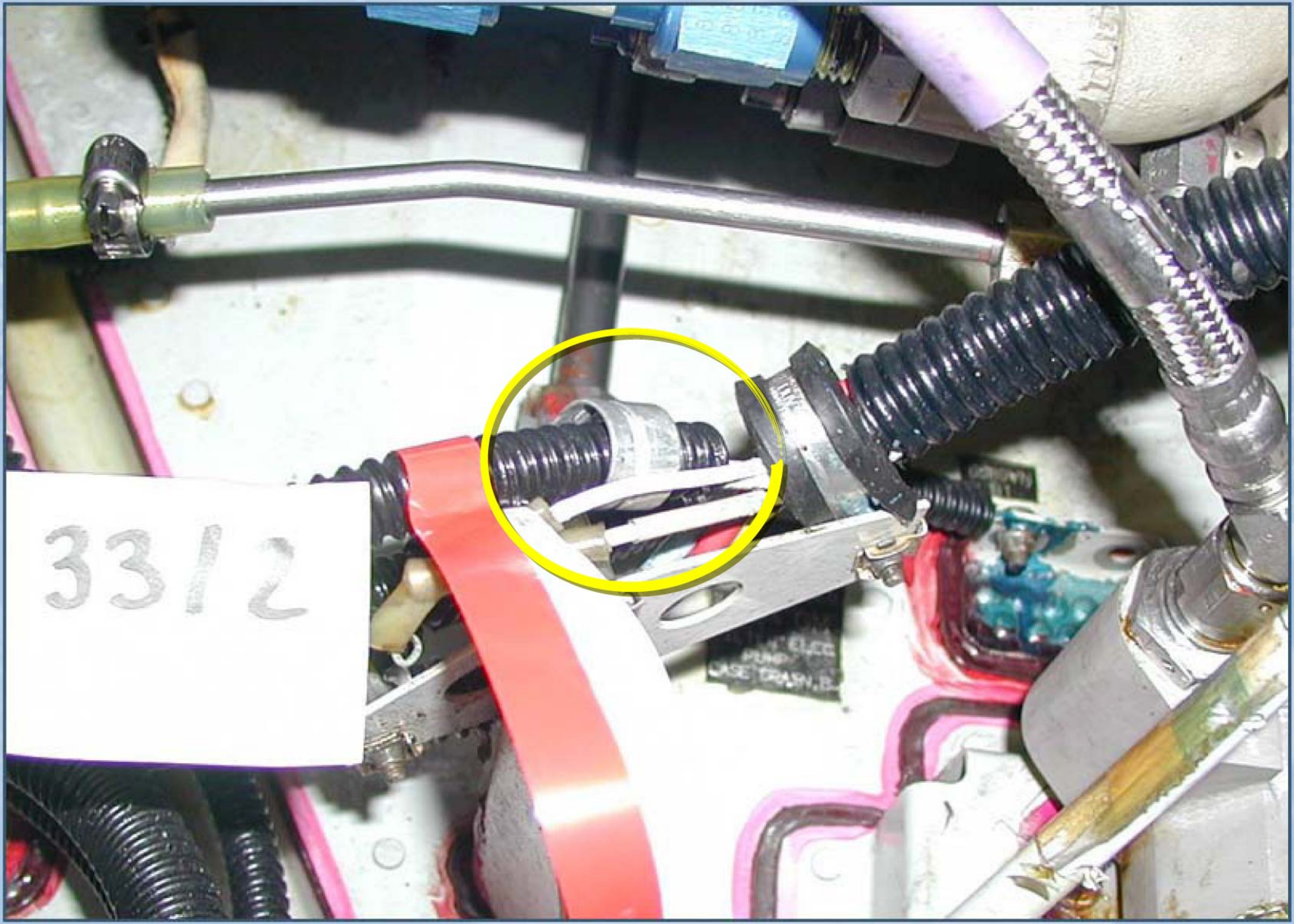

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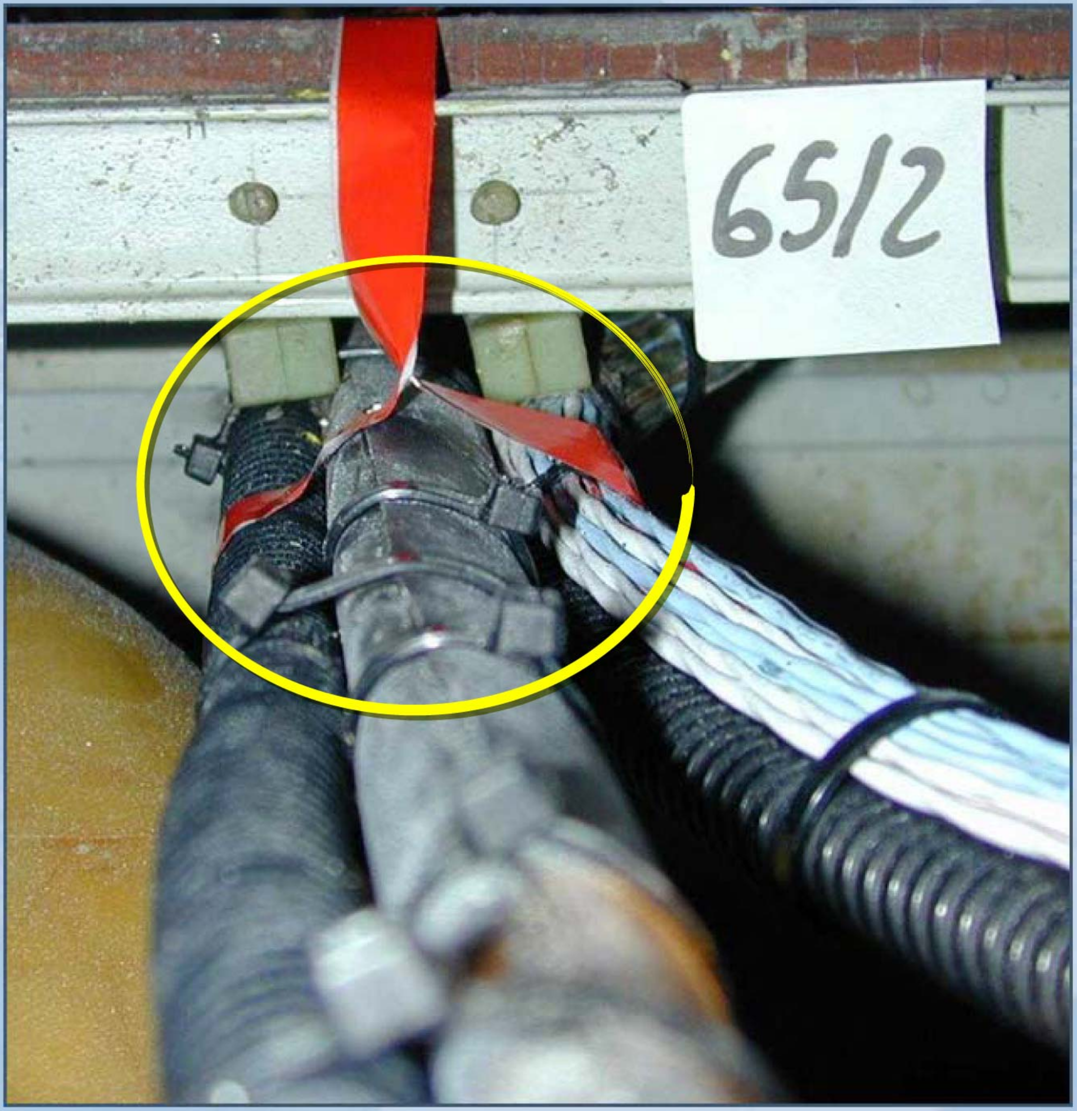

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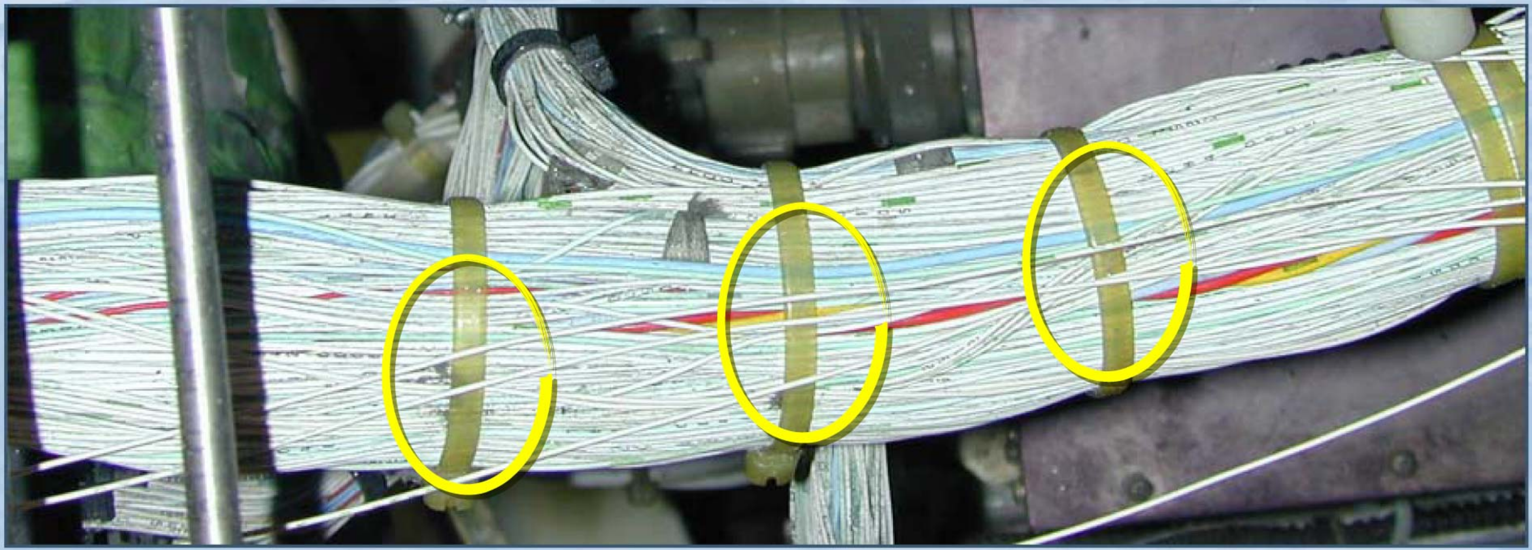

WIRING SYSTEM DAMAGE - MAINTENANCE

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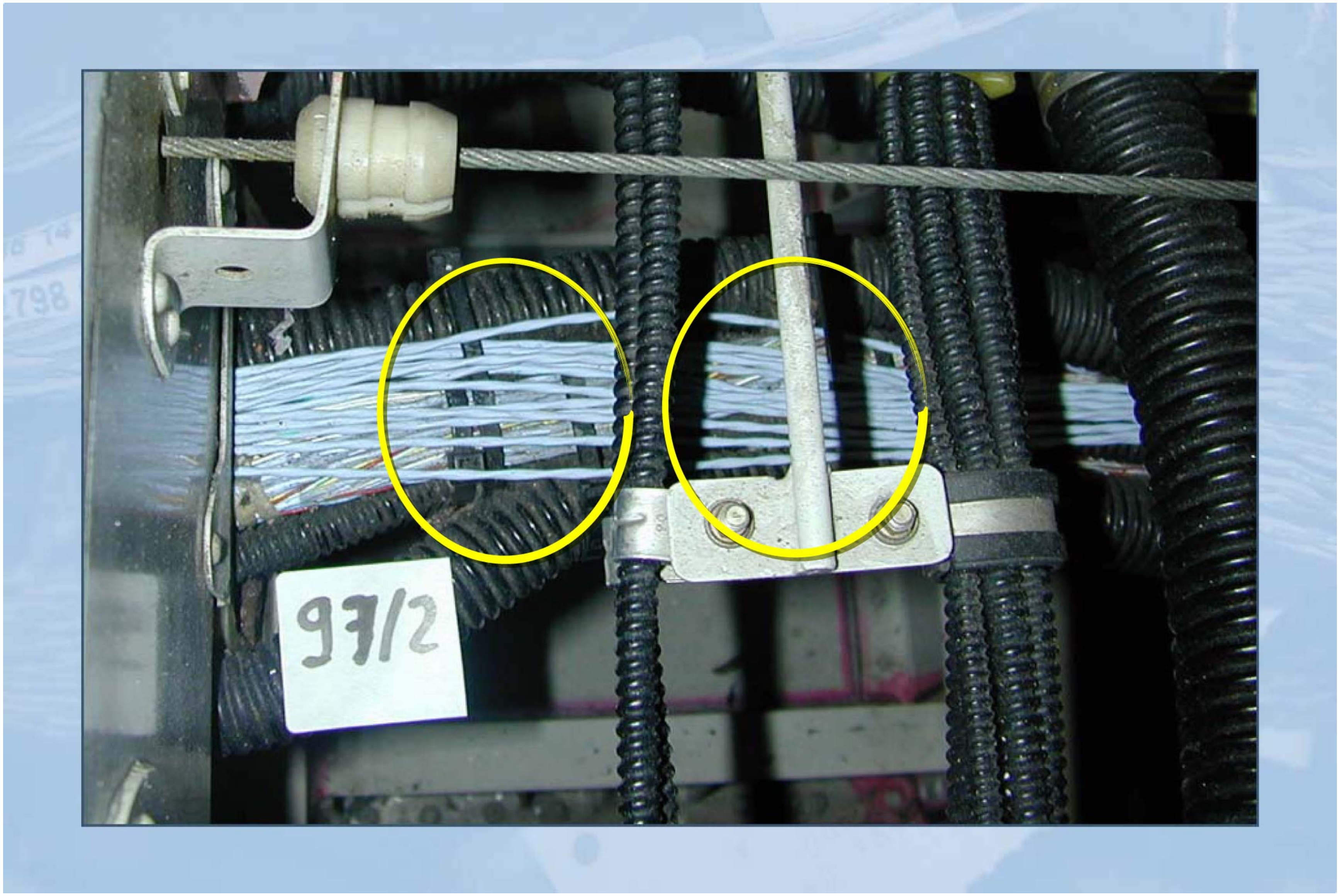

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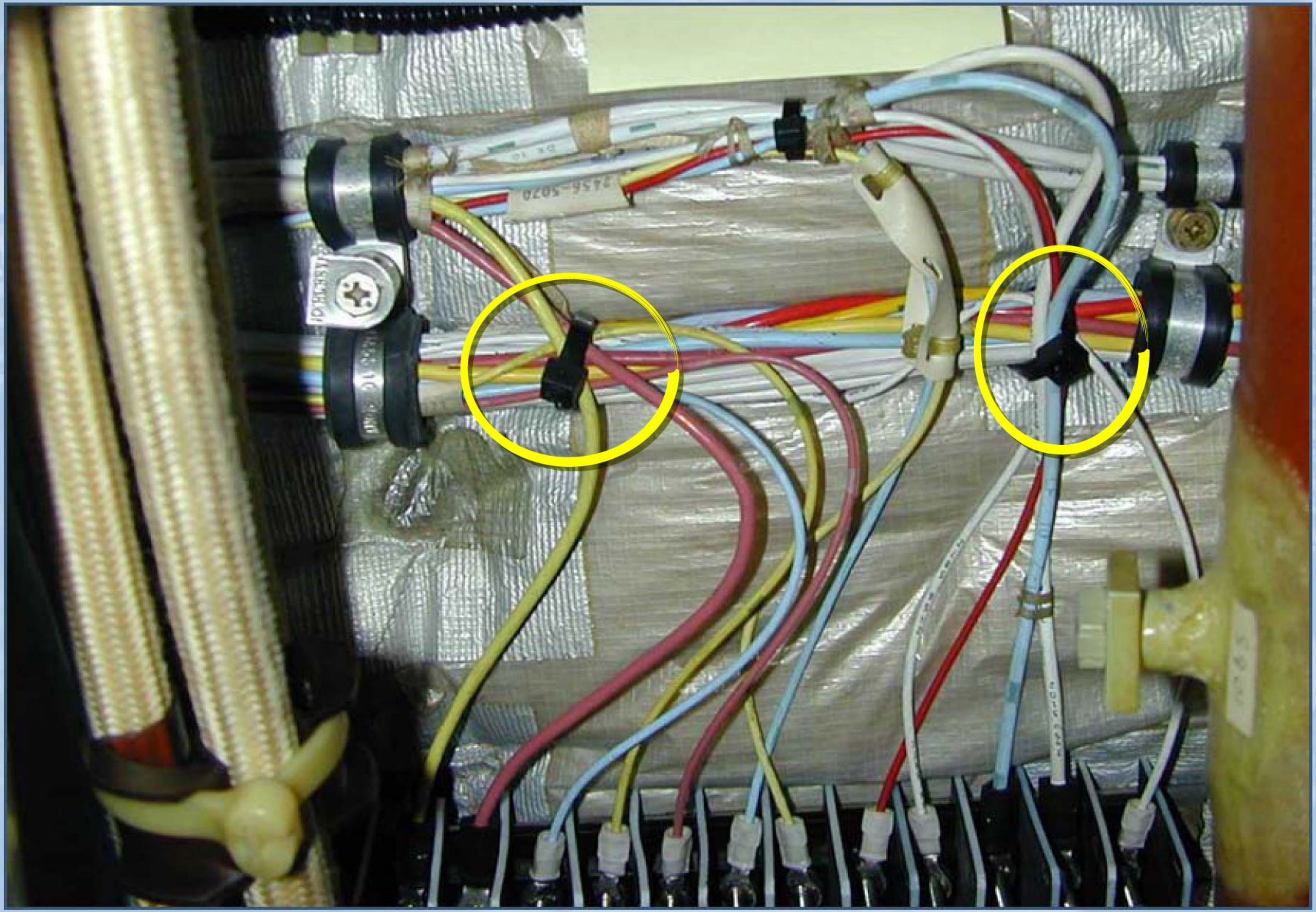

WIRING SYSTEM DAMAGE - MAINTENANCE

WIRING SYSTEM DAMAGE

WIRING SYSTEM DAMAGE (continued)

MOISTURE

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MOISTURE
MOISTURE
MOISTURE

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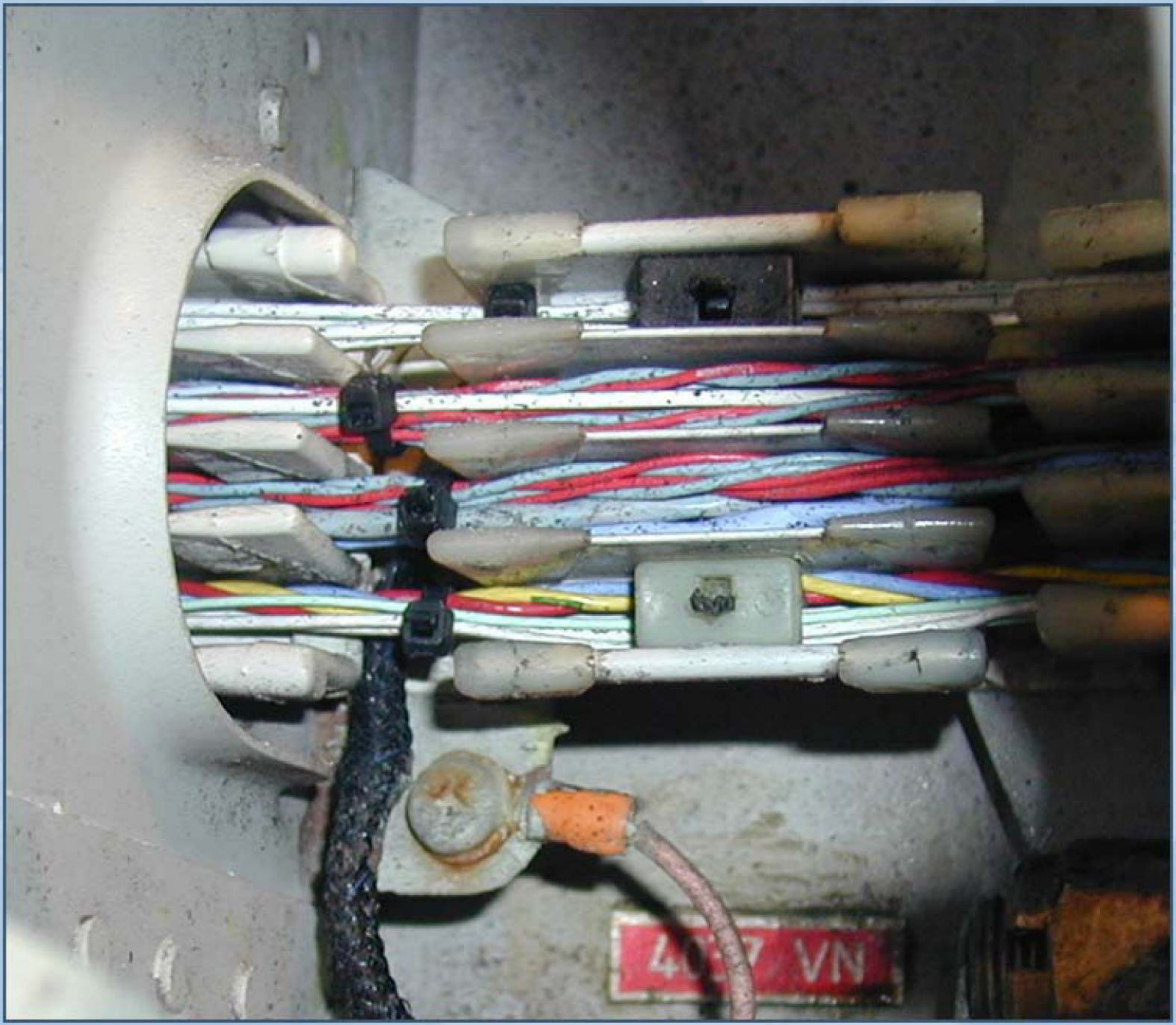

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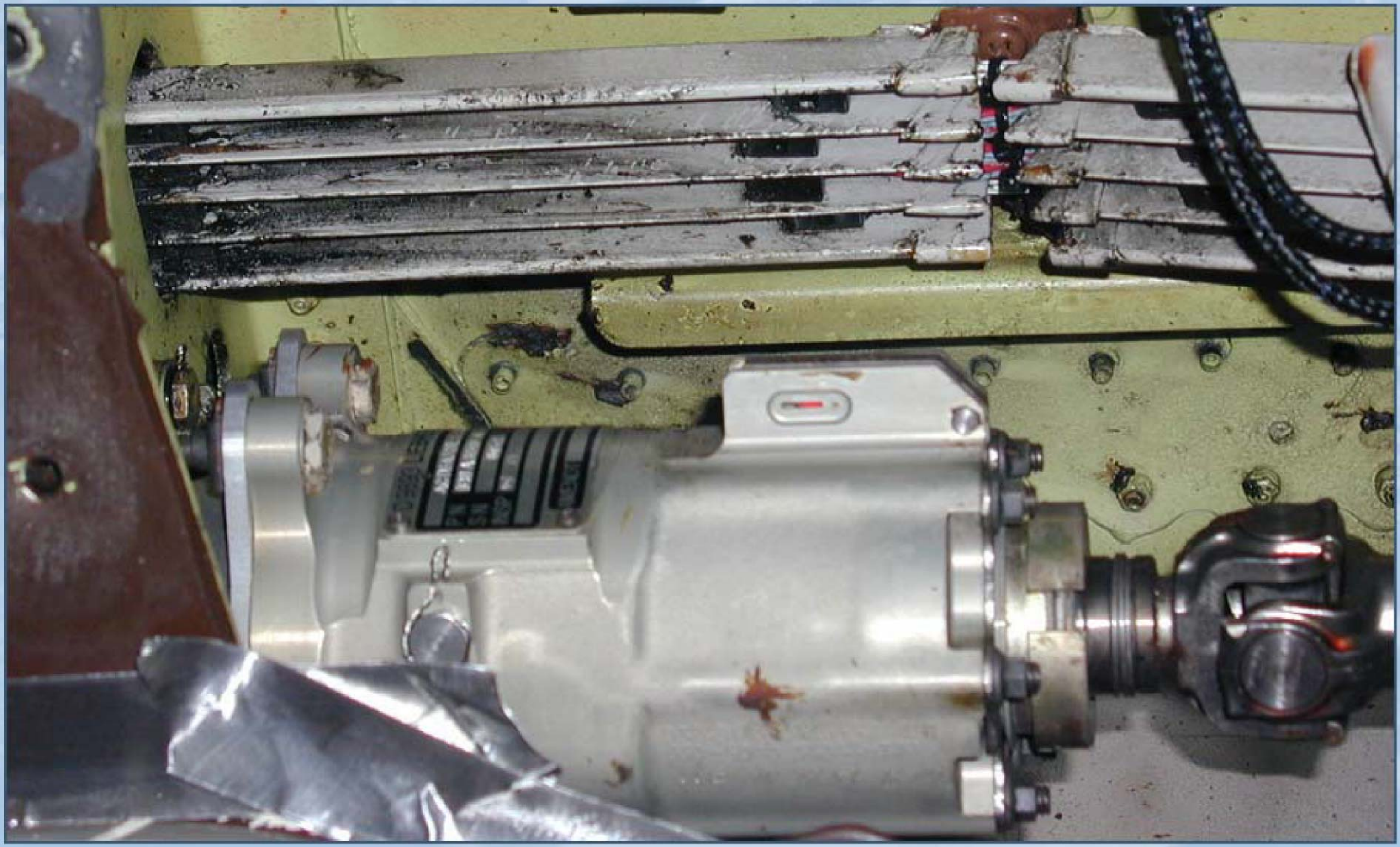

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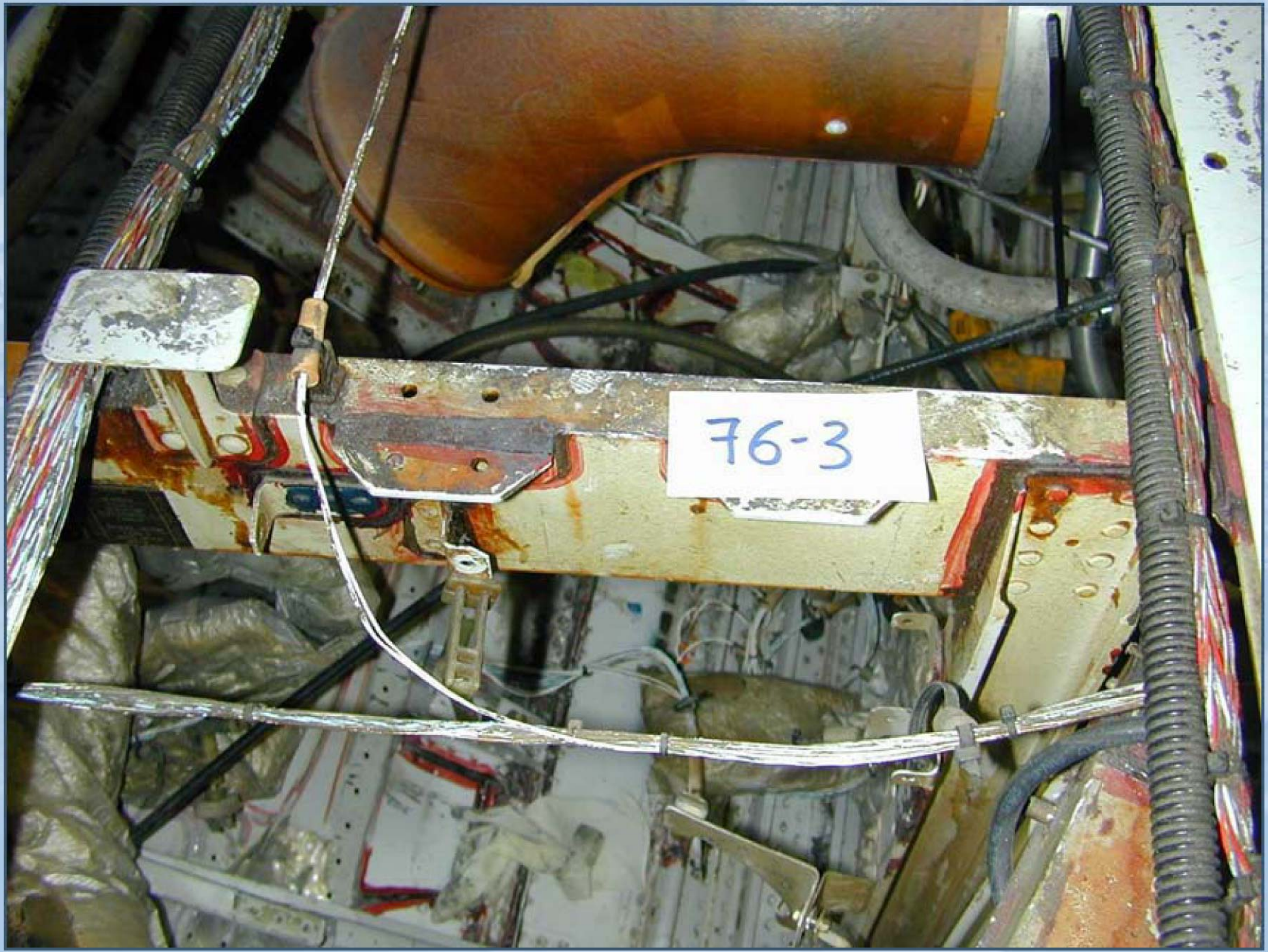
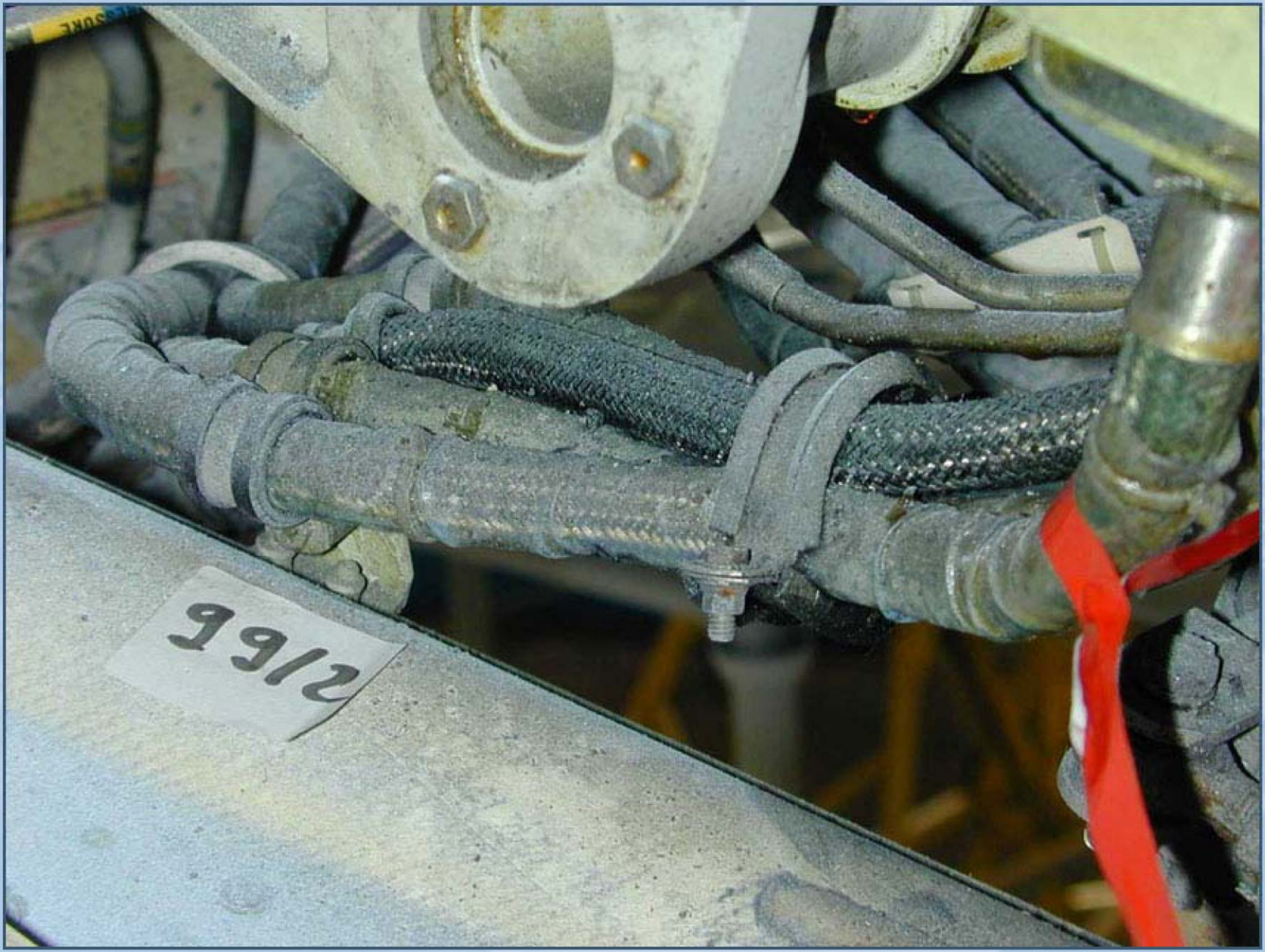
WIRING SYSTEM DAMAGE - MOISTURE



WIRING SYSTEM DAMAGE - MOISTURE

WIRING SYSTEM DAMAGE - MOISTURE



WIRING SYSTEM DAMAGE - MOISTURE

X8U08481 - X0332T0 - XM2016000000001

WIRING SYSTEM DAMAGE - MOISTURE

EXTERNAL CONTAMINATION SOURCES

HOUSEKEEPING

Airplane external contamination sources
External contamination:
- De ice fluid.

External contamination:
- De ice fluid.
- Water and rain.

External contamination:
- De ice fluid.
- Water and rain.
- Snow and ice.

External contamination:
- De ice fluid.
- Water and rain.
- Snow and ice.
- Miscellaneous; air erosion.

HOUSEKEEPING

HOUSEKEEPING

HOUSEKEEPING

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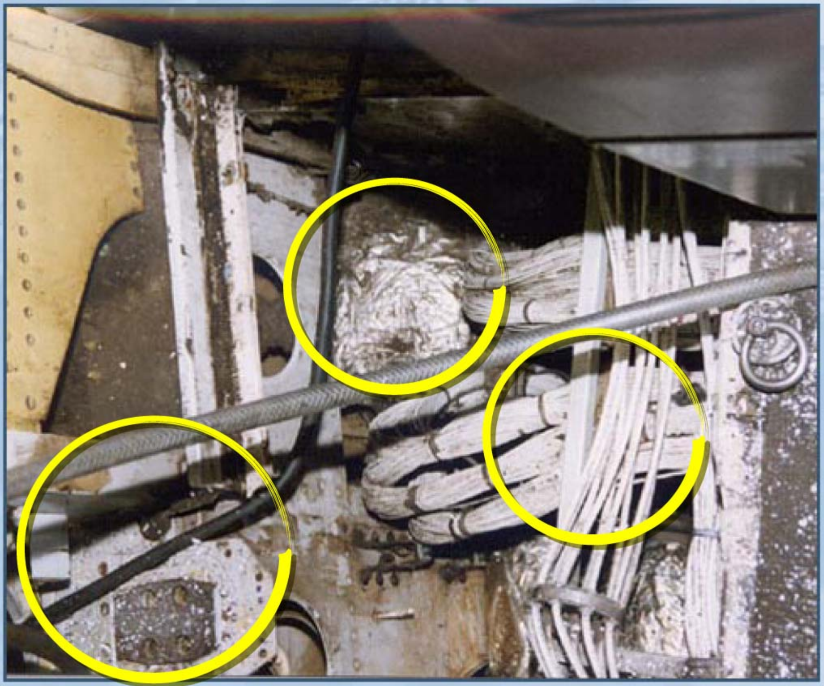

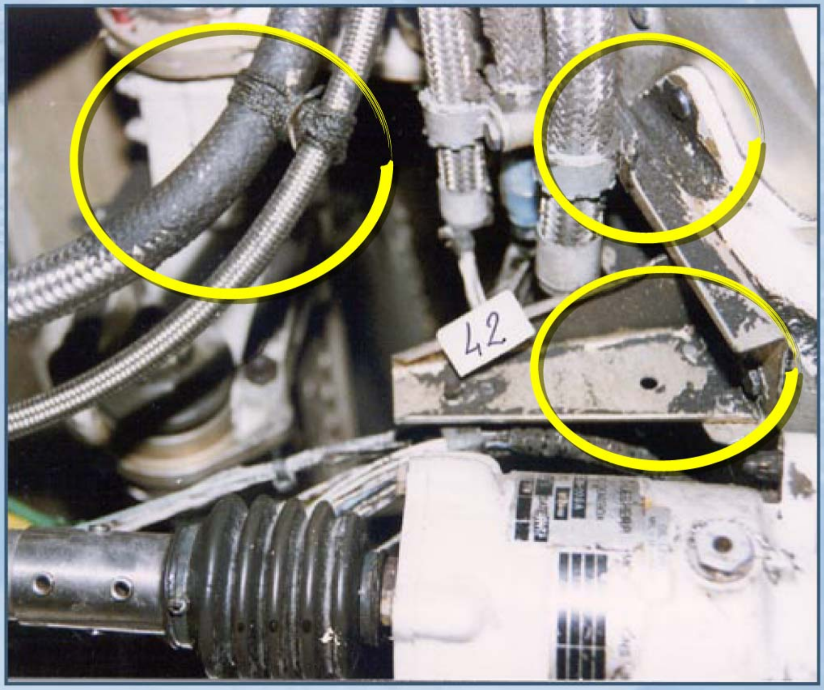

HOUSEKEEPING

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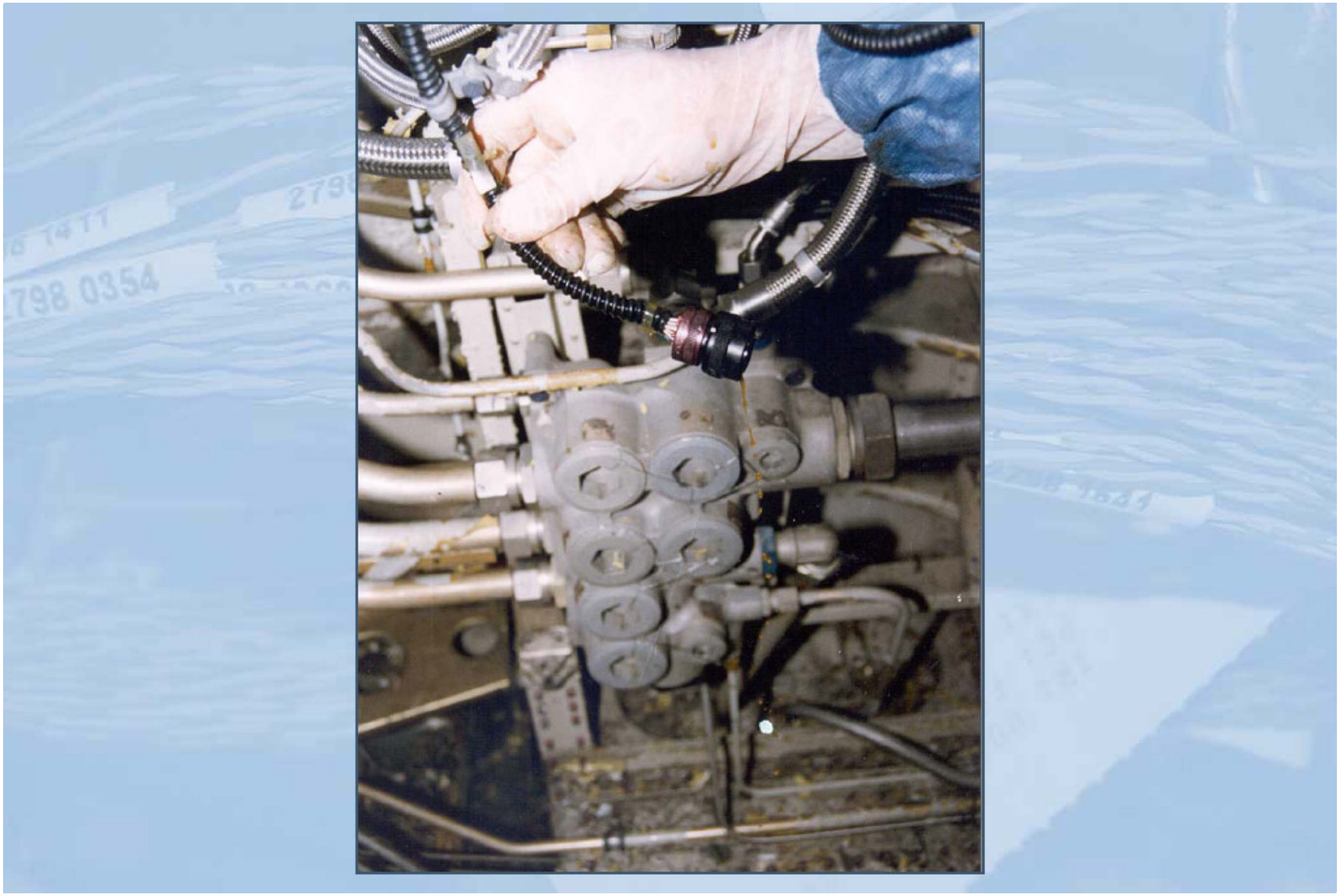
INTERNAL CONTAMINATION SOURCES

HOUSEKEEPING

Airplane internal contamination sources
Internal contamination.
Example: hydraulic oil.
Hydraulic oil.
Hydraulic oil.
Hydraulic oil.
Hydraulic oil.
Hydraulic oil.
Engines and APU oil.
Engines and APU oil.
Engines and APU oil.
Grease contamination.
Grease contamination.
Galley and toilets.
Lint / Dust.
Lint / Dust.
Lint / Dust.
Lint / Dust.
Lint / Dust.
Lint / Dust.
Bleed air and hot areas.
Bleed air and hot areas.
Bleed air and hot areas.
Bleed air and hot areas.

HOUSEKEEPING



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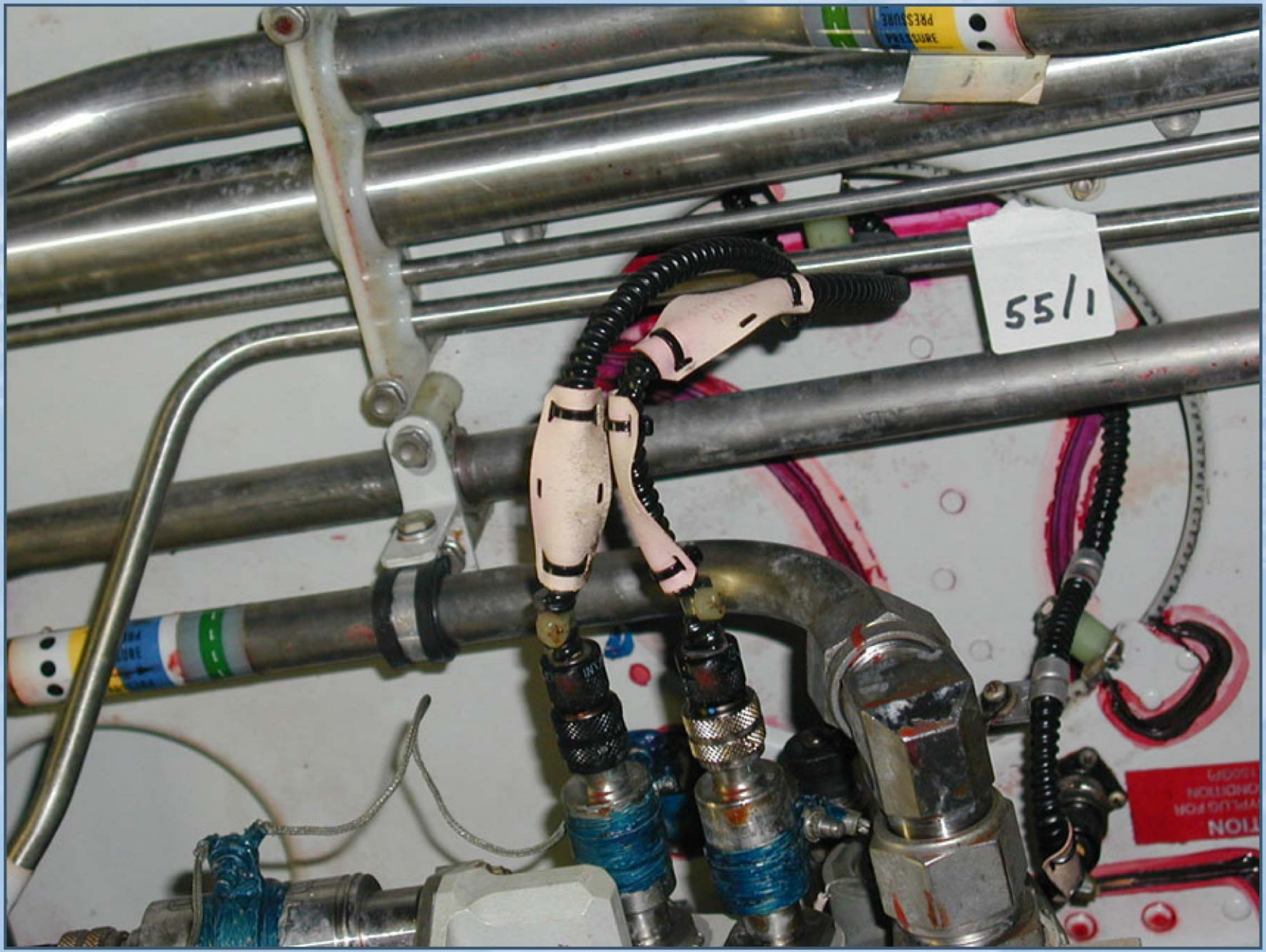

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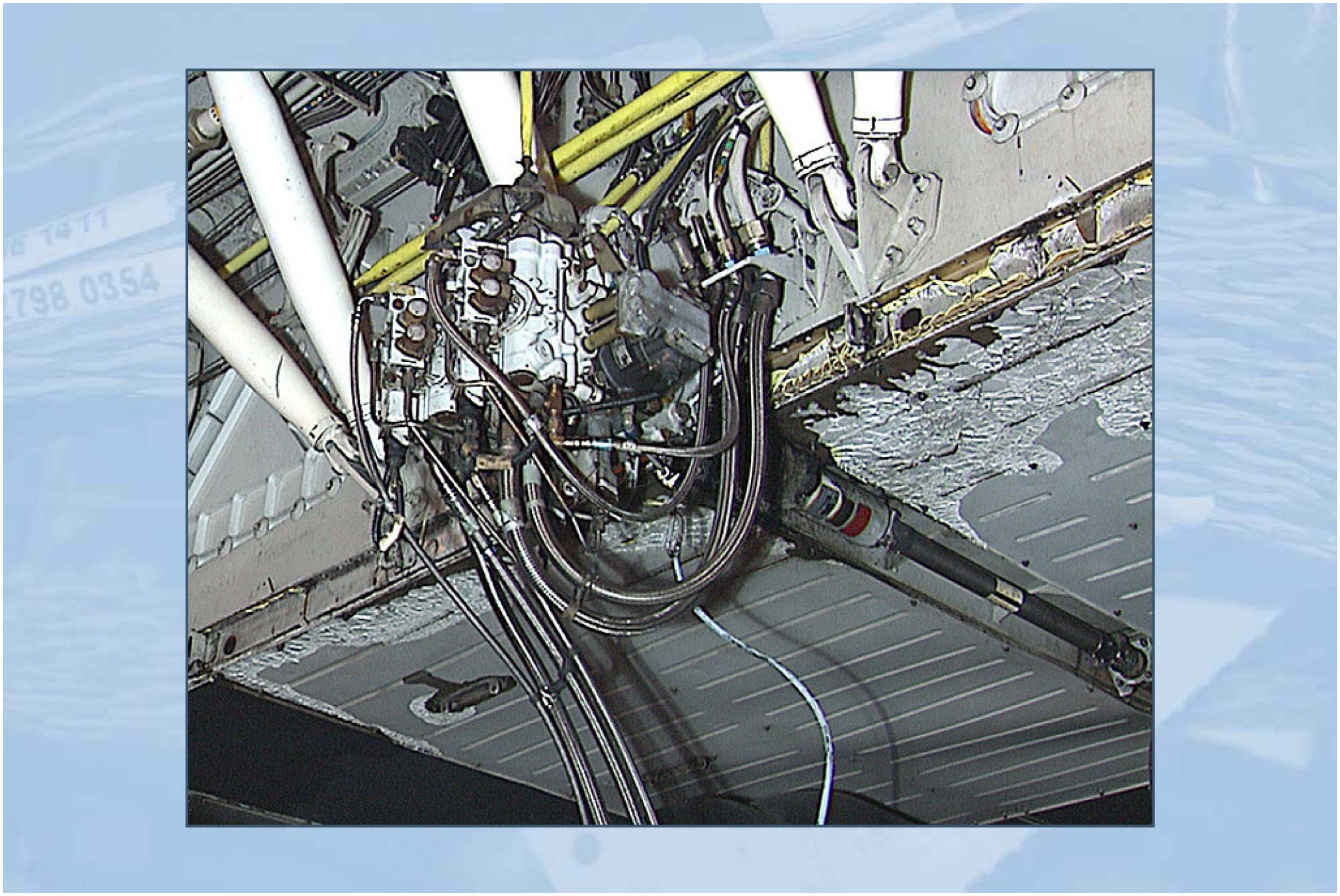

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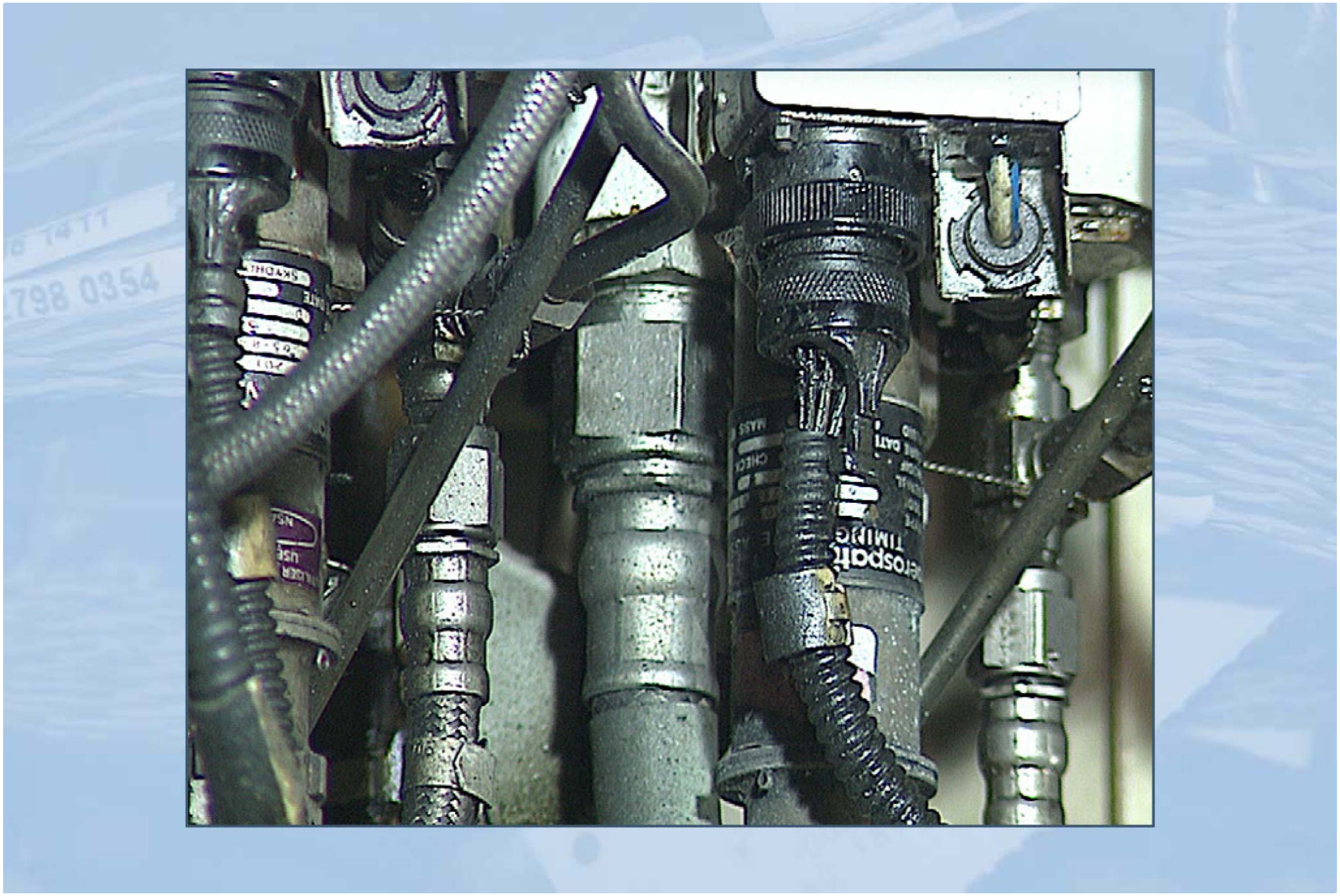

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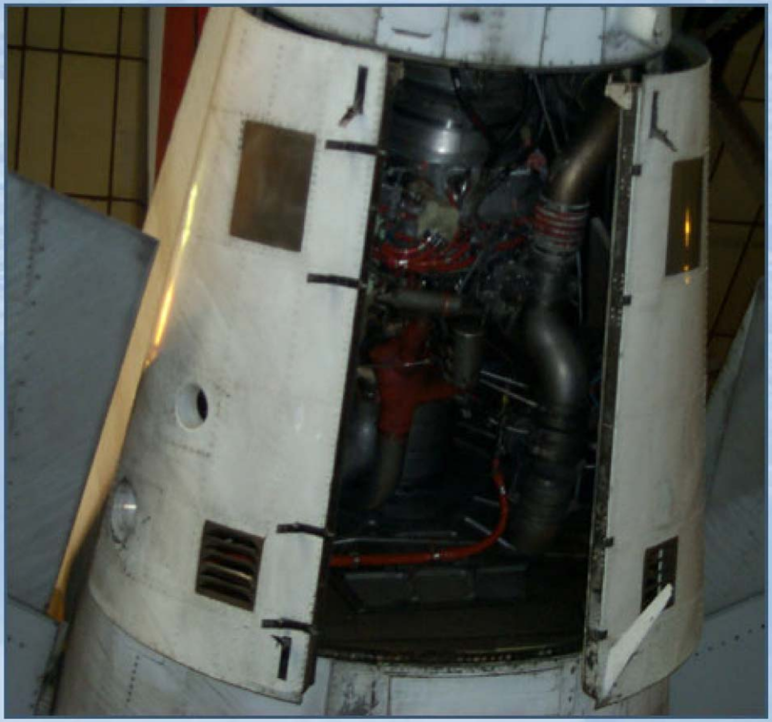

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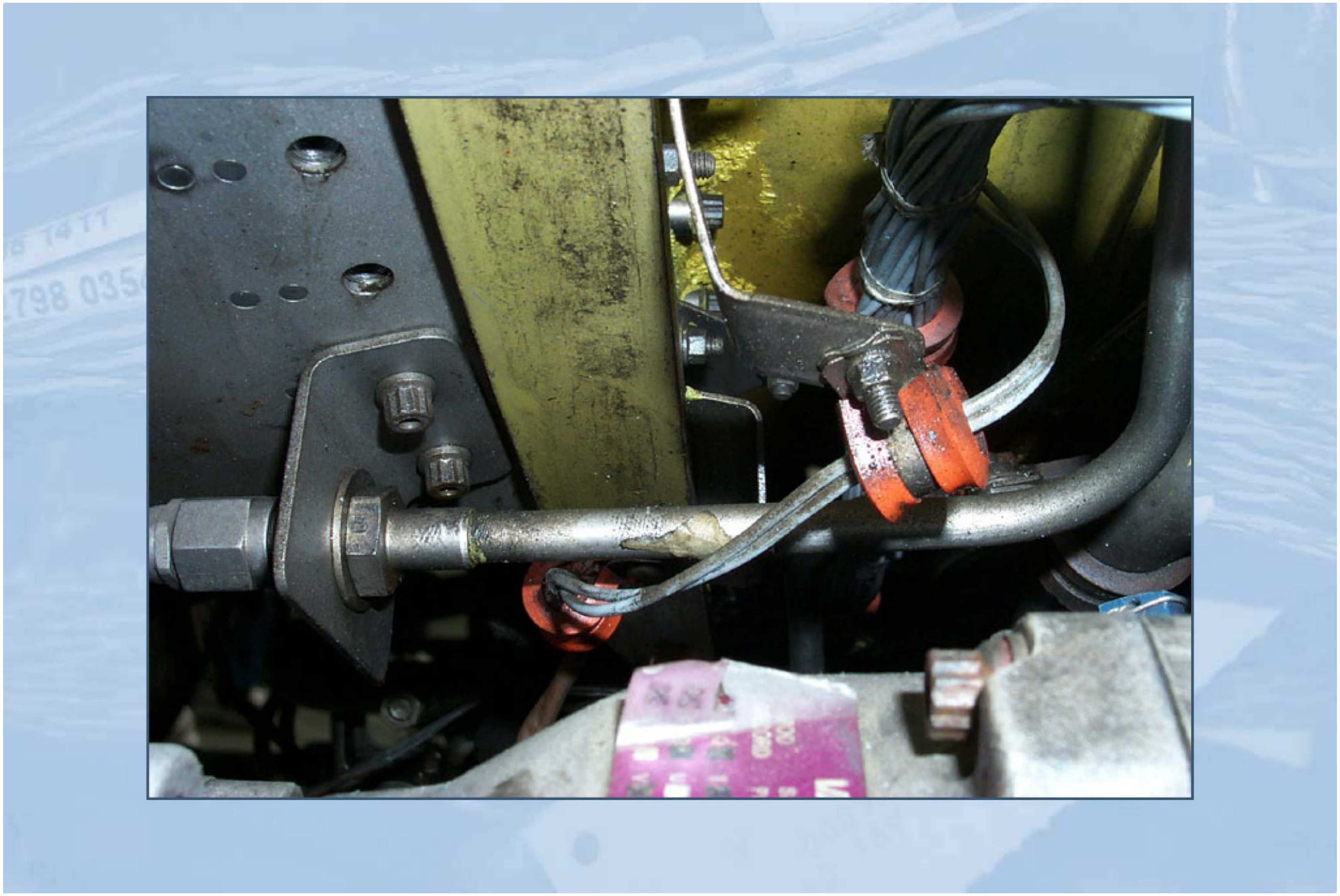

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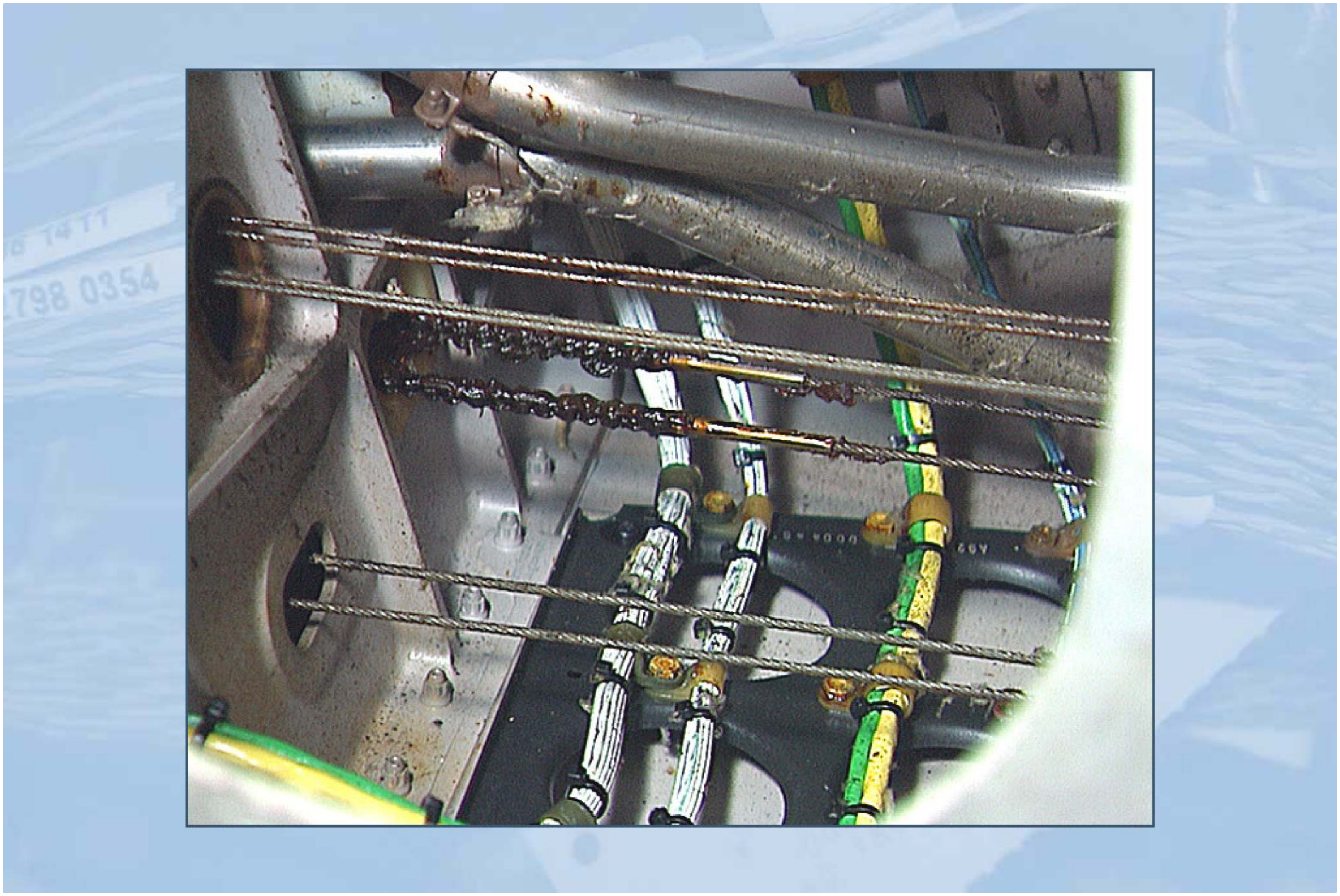

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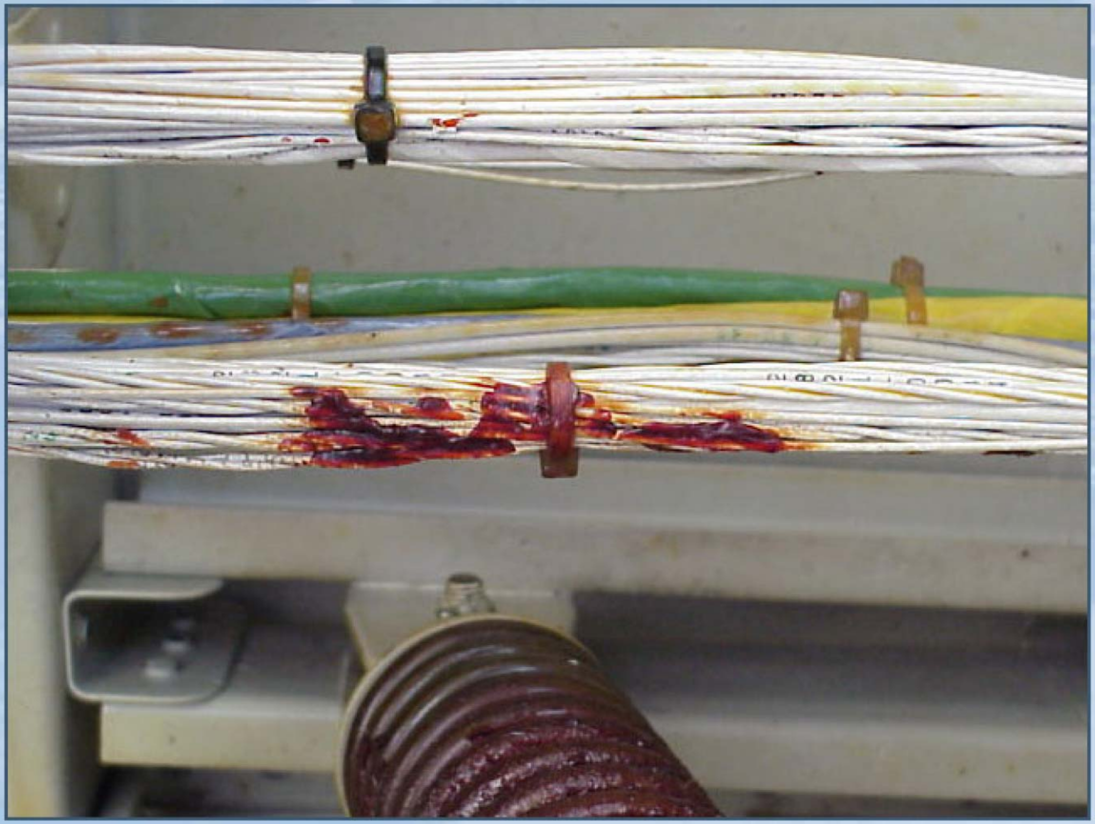

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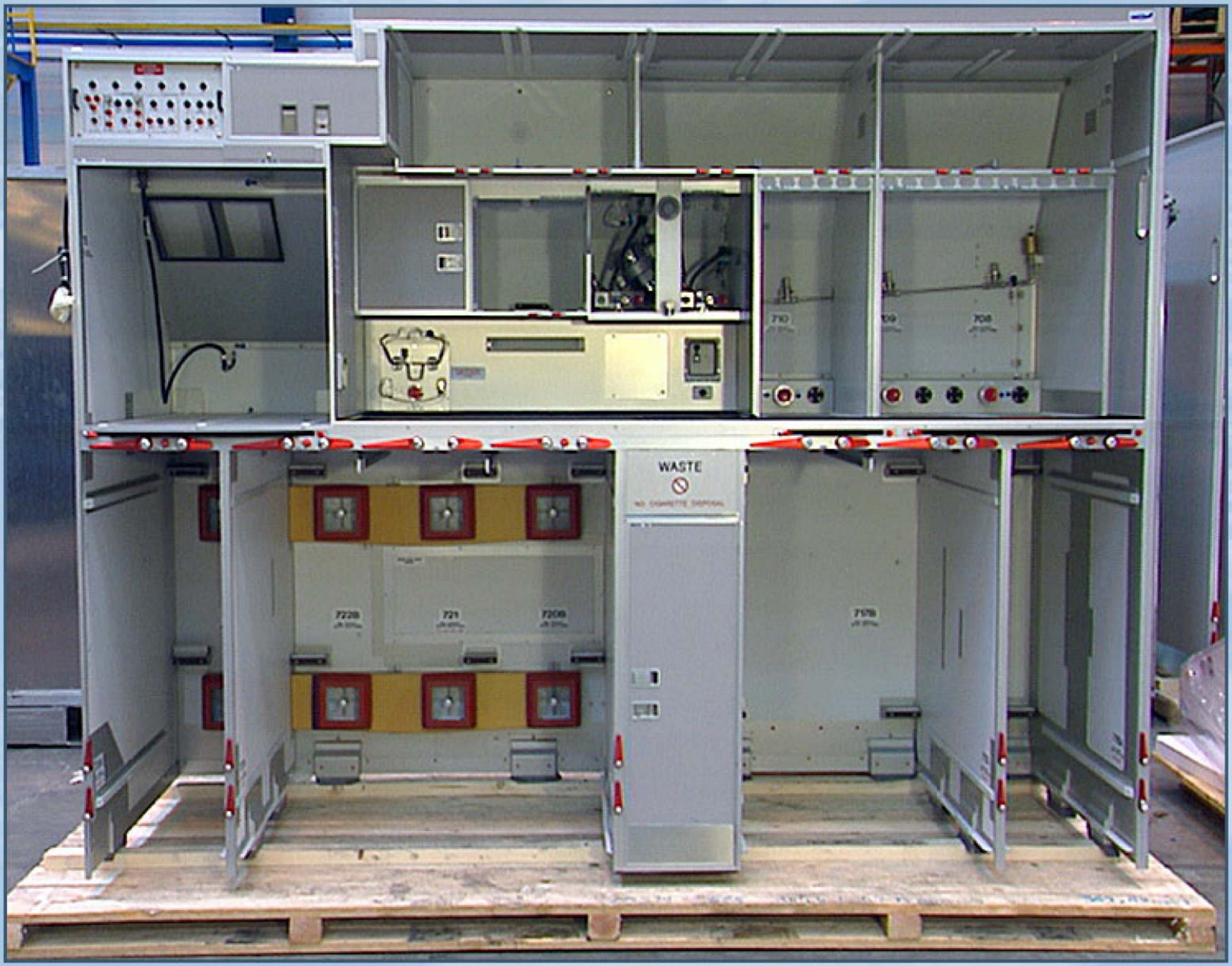

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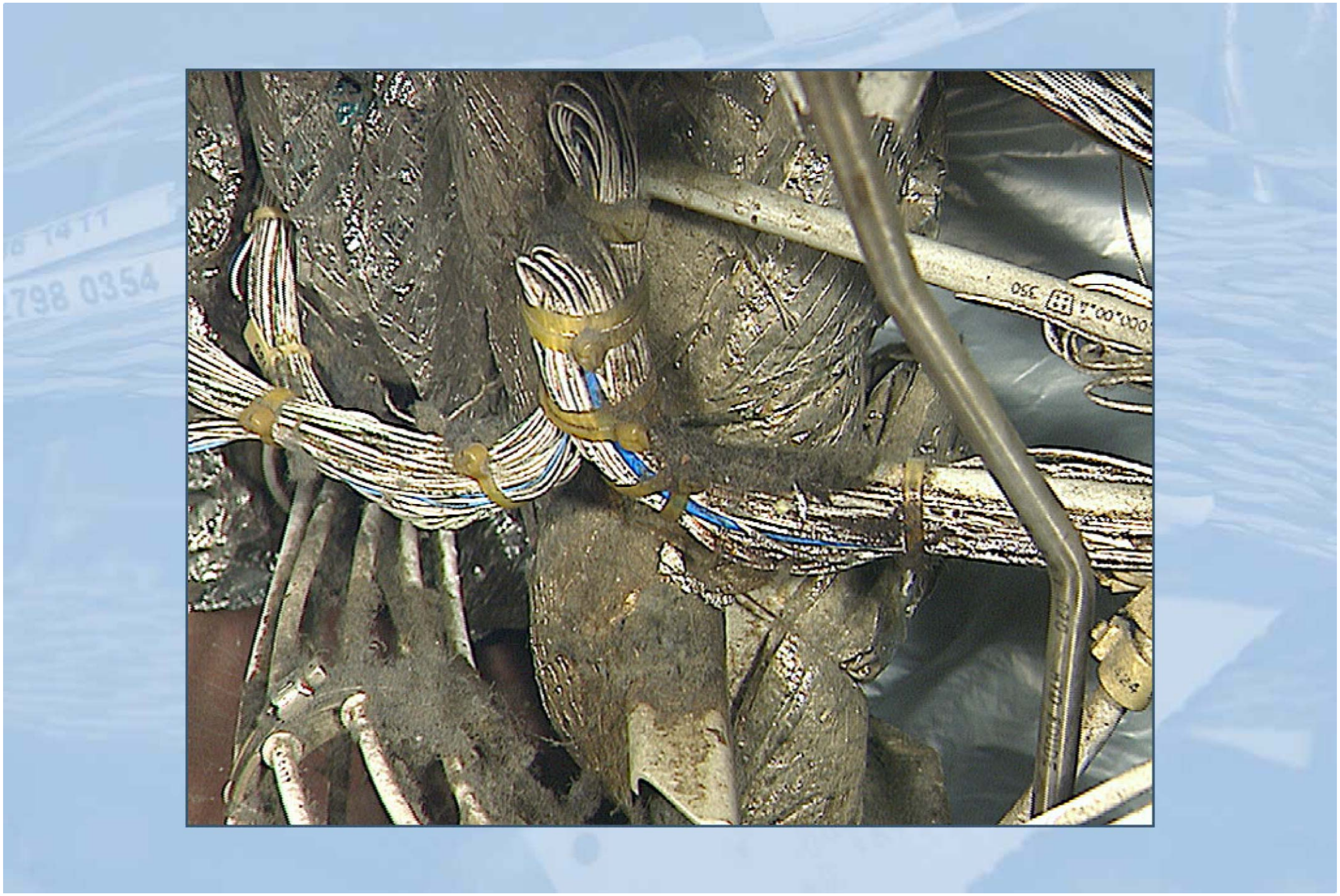

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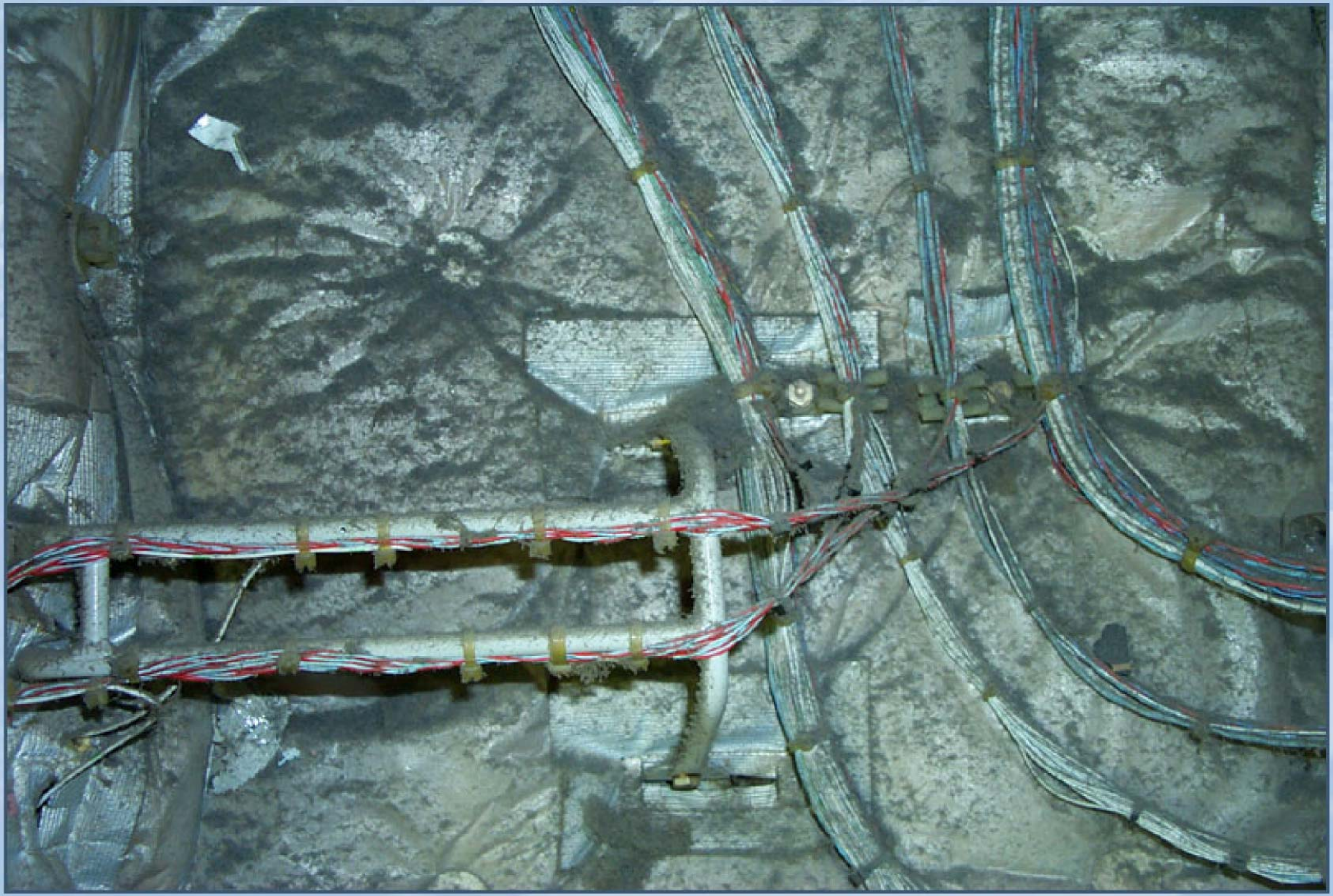

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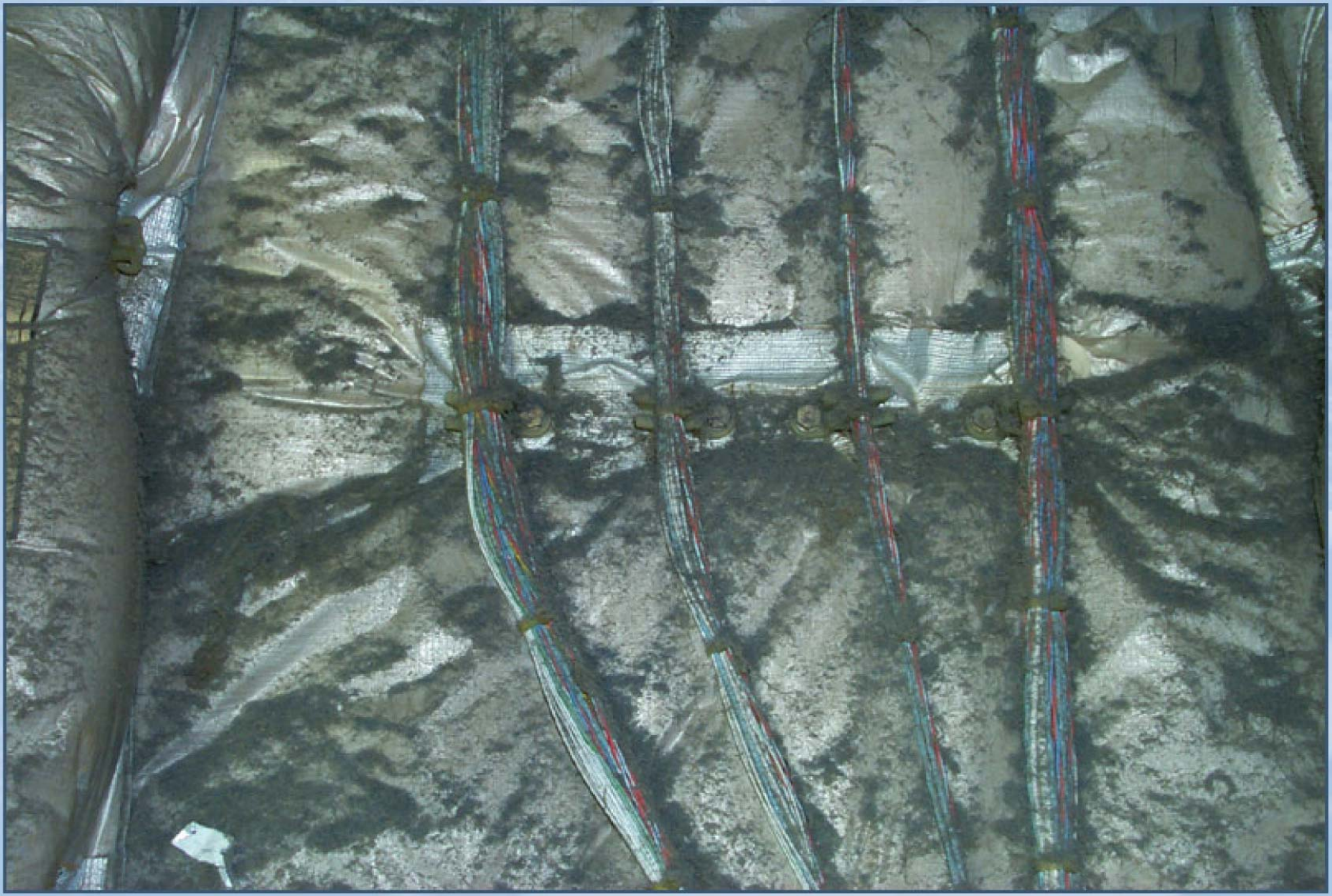

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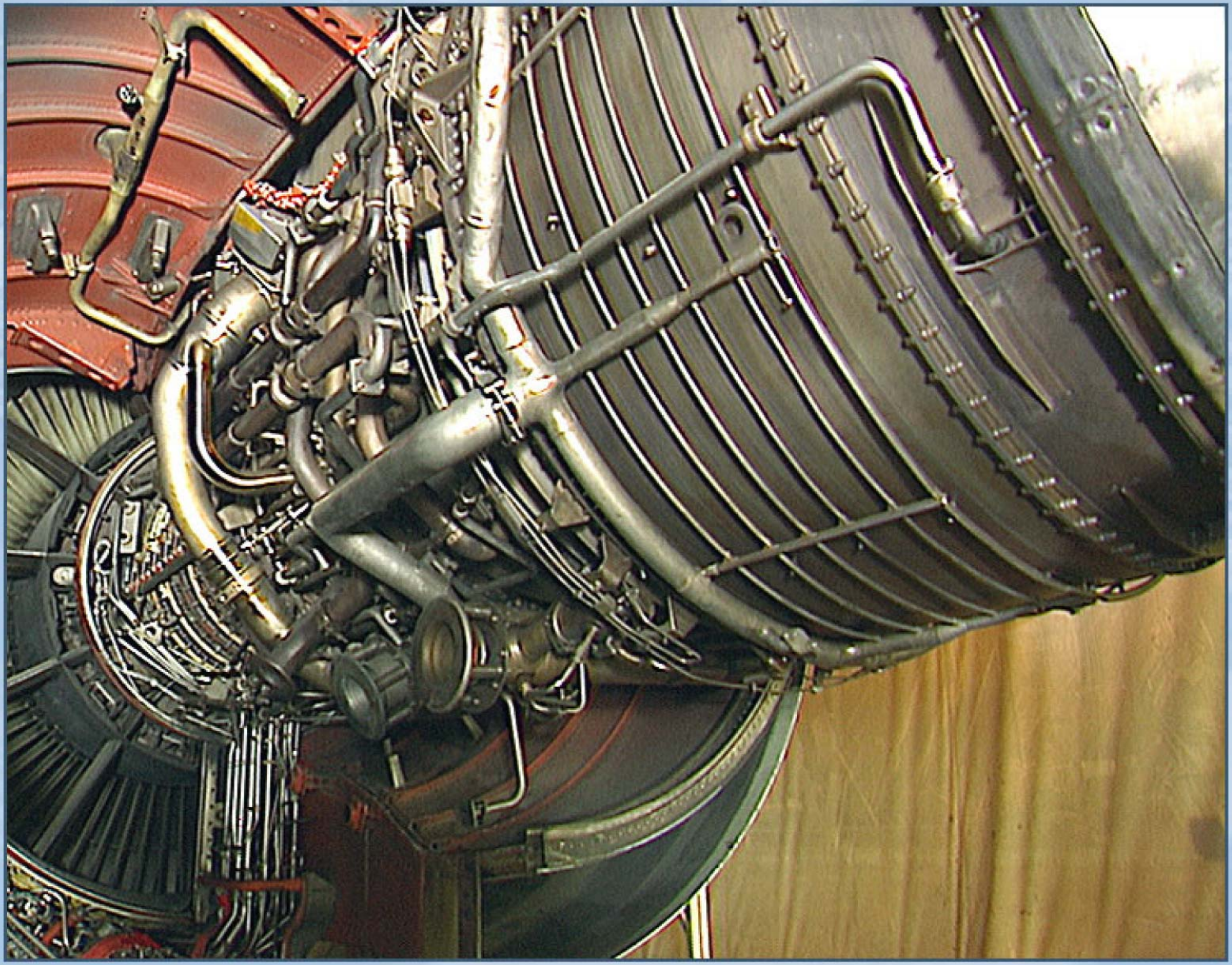

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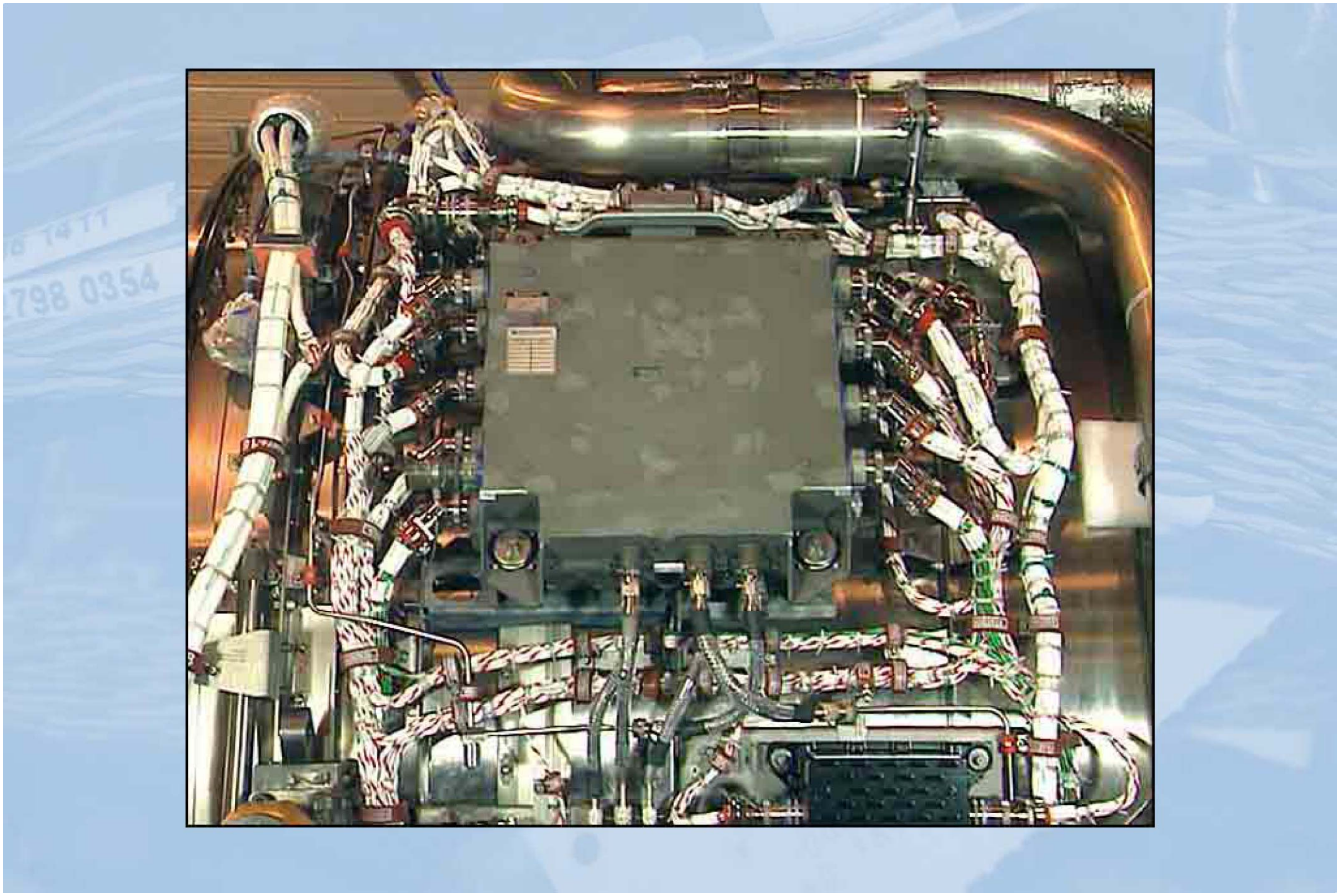

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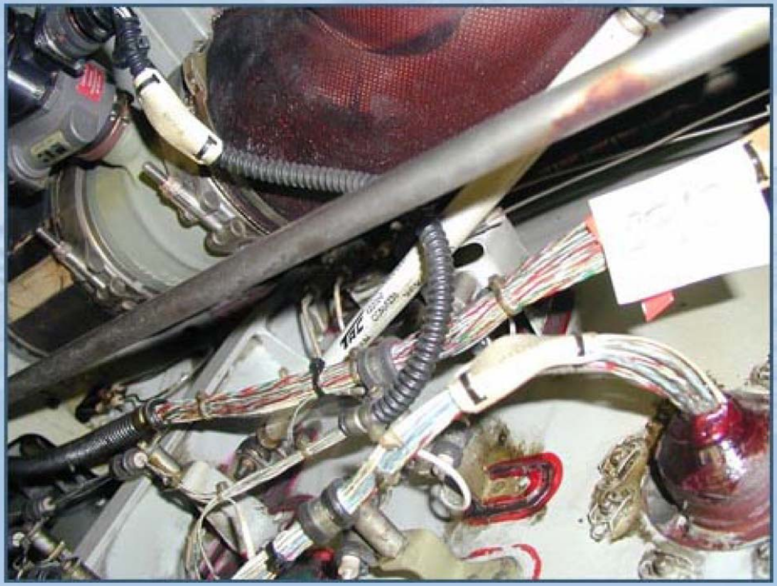

HOUSEKEEPING

HOUSEKEEPING

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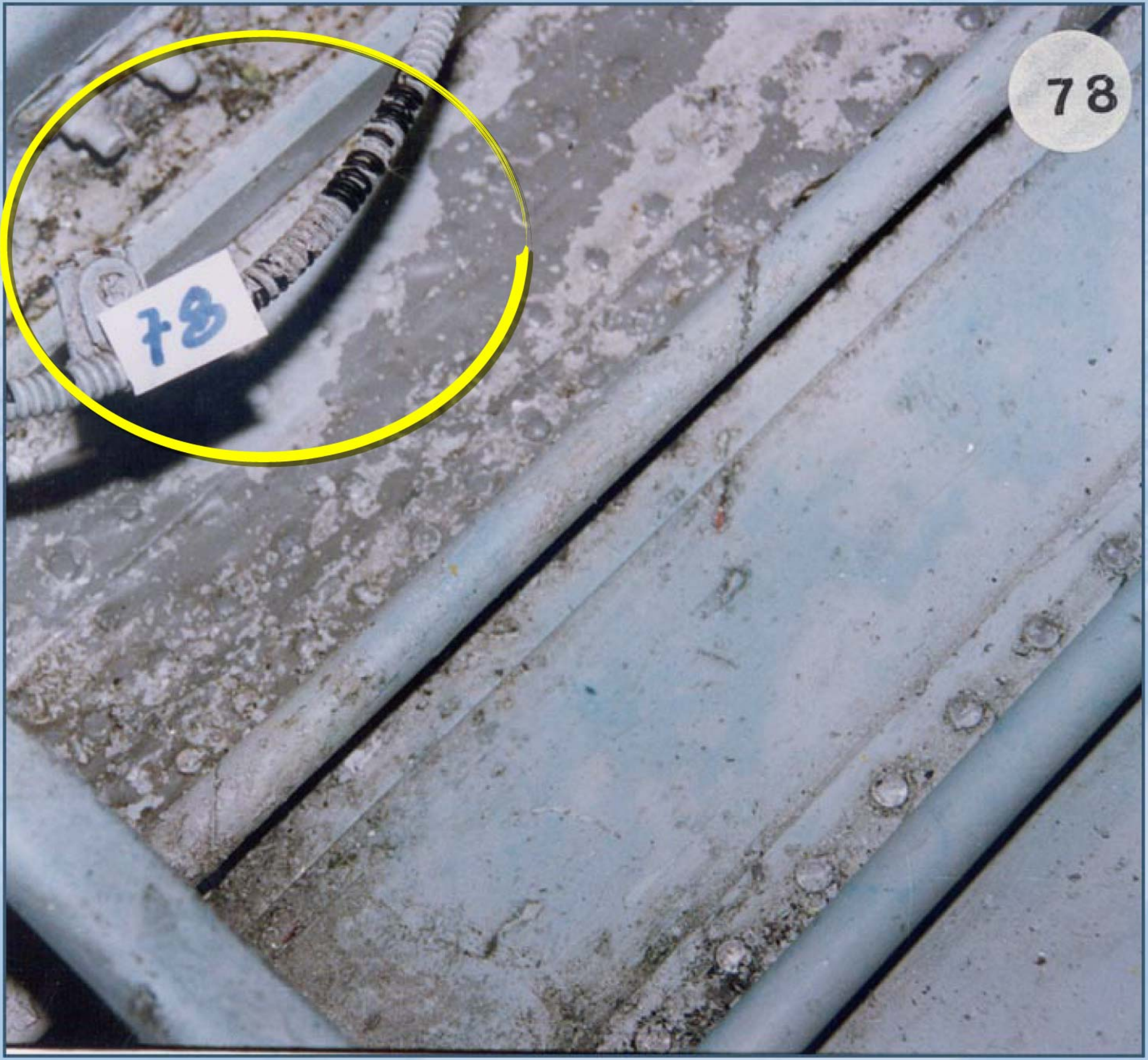
OTHER CONTAMINATION SOURCES

HOUSEKEEPING

Other contamination sources:
Paint.
Other contamination sources:
Paint.
Other contamination sources:
Paint.
Corrosion inhibitor.
Corrosion inhibitor.
Corrosion inhibitor
Corrosion inhibitor.
Corrosion inhibitor.
Drill shavings / Swarf.
Drill shavings / Swarf.
Drill shavings / Swarf.
Drill shavings / Swarf.
Drill shavings / Swarf.
Drill shavings / Swarf.
Drill shavings / Swarf.
Drill shavings / Swarf.
Foreign objects (screws, washers, rivets, tools, etc.)



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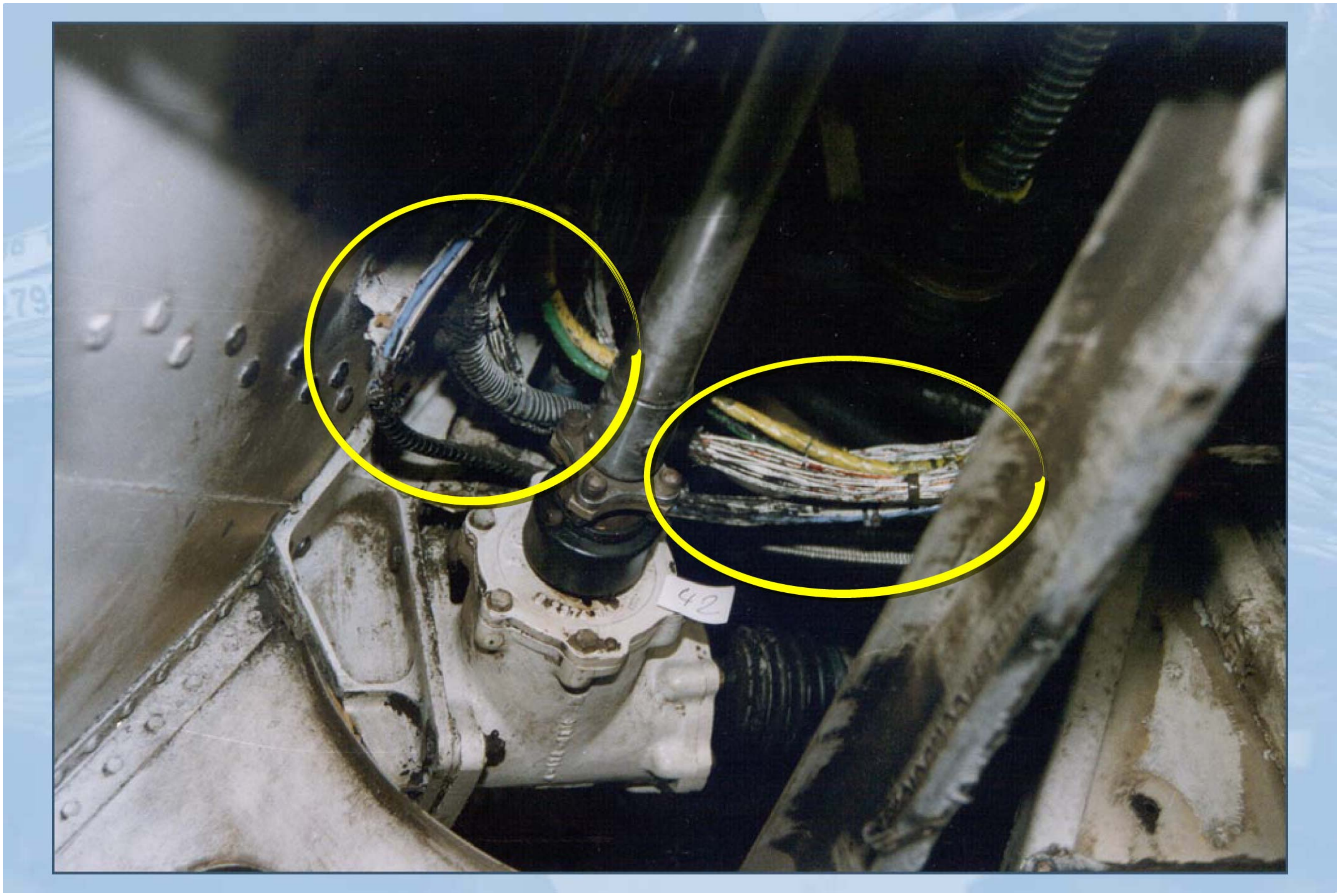

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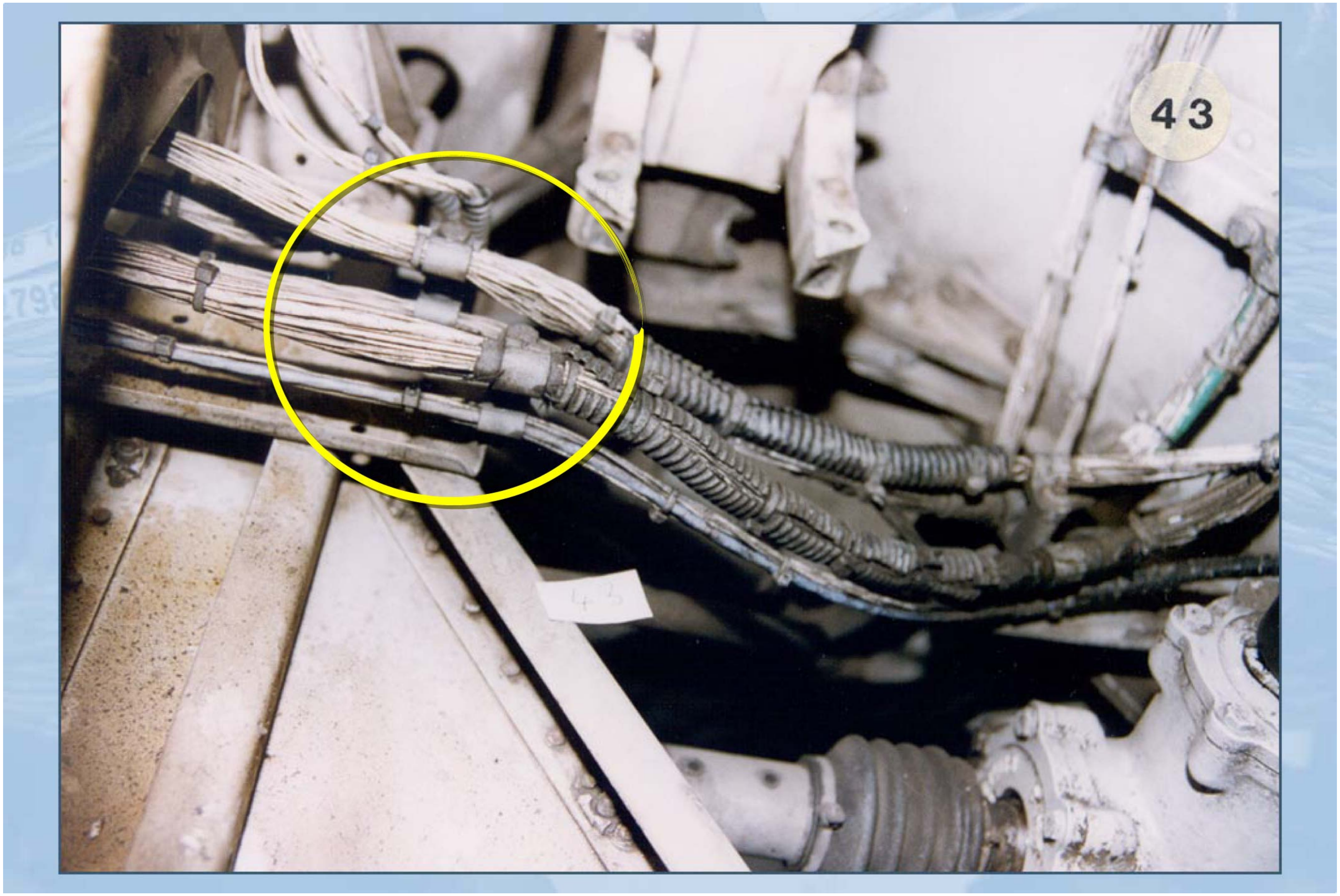

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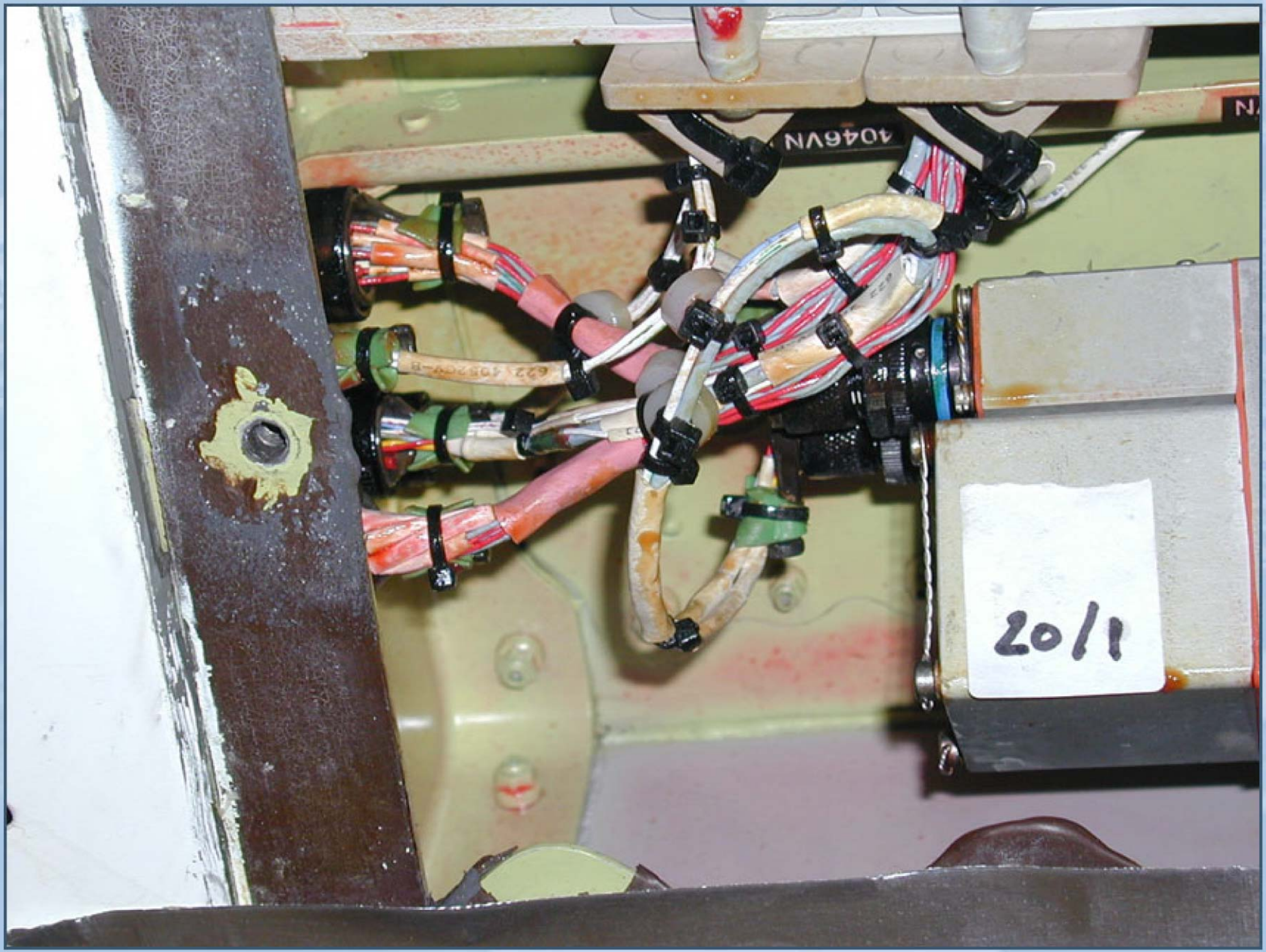

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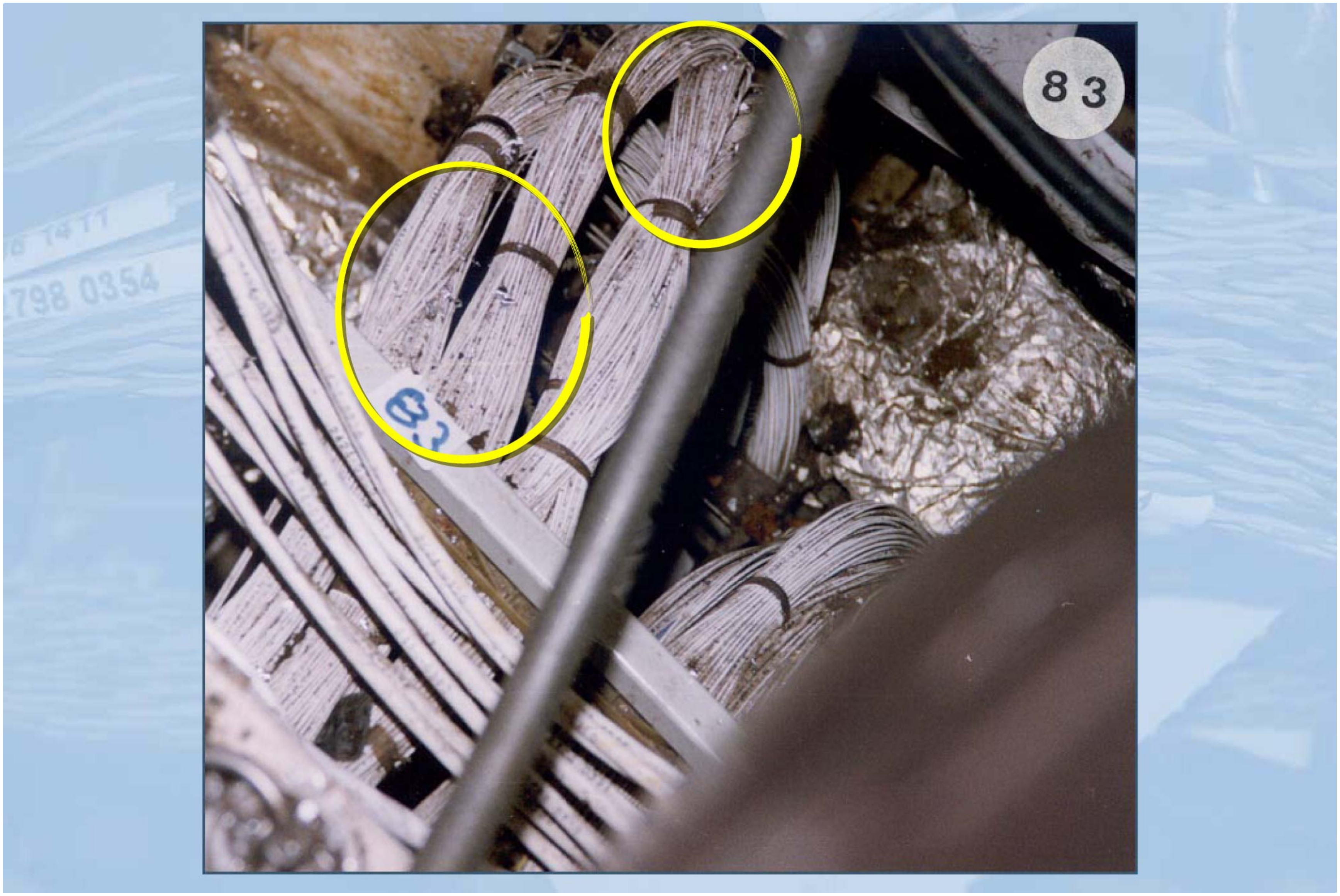

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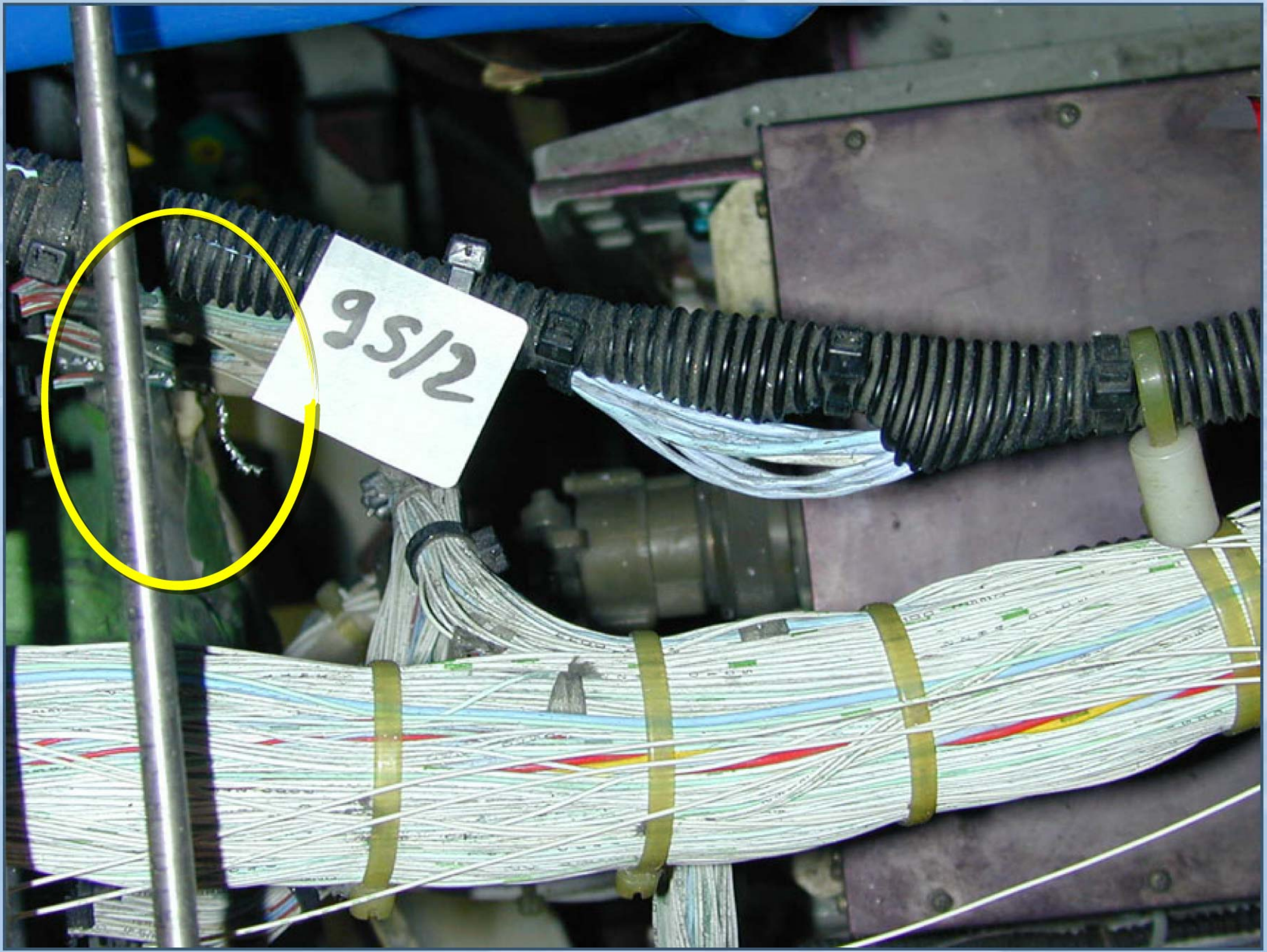

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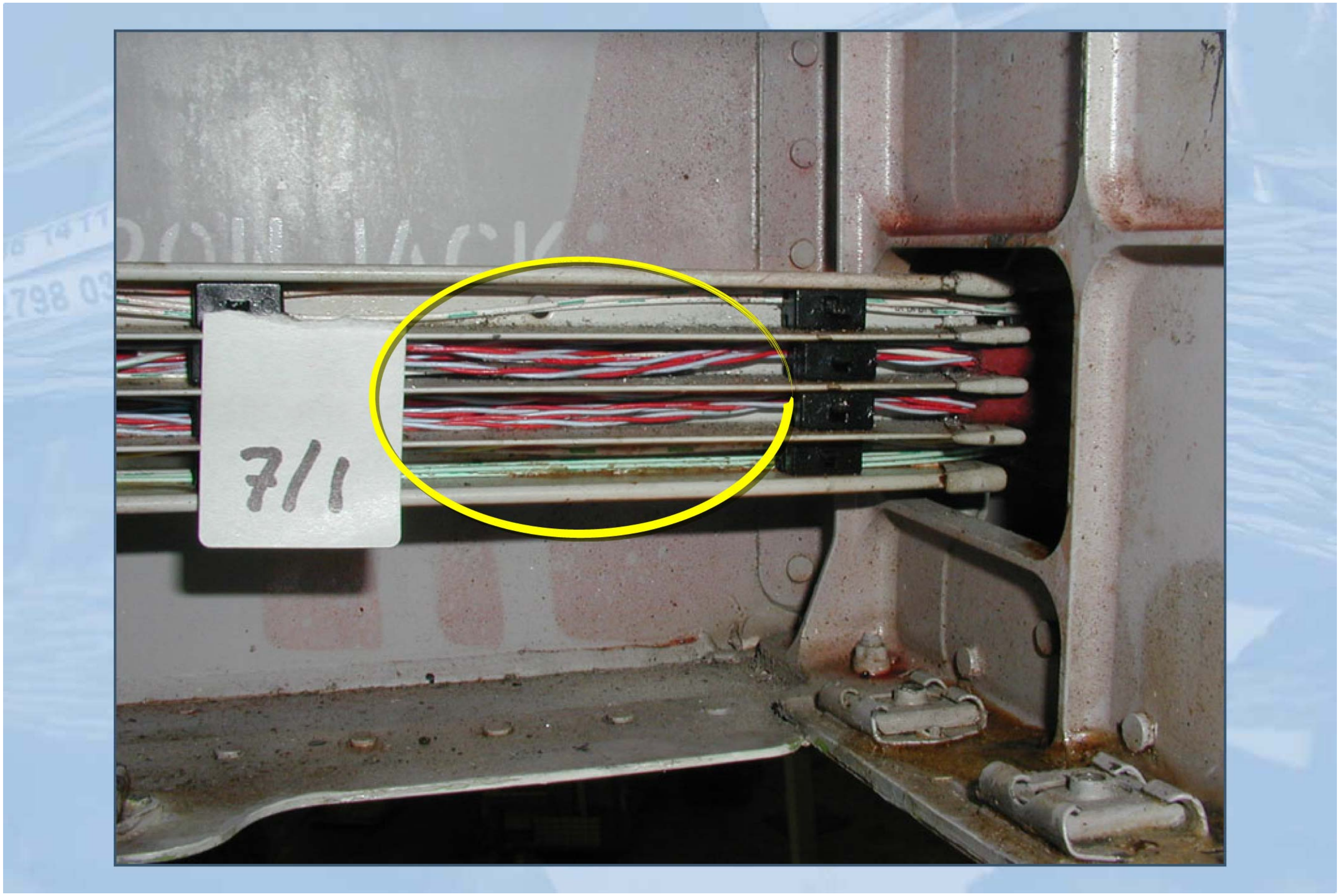

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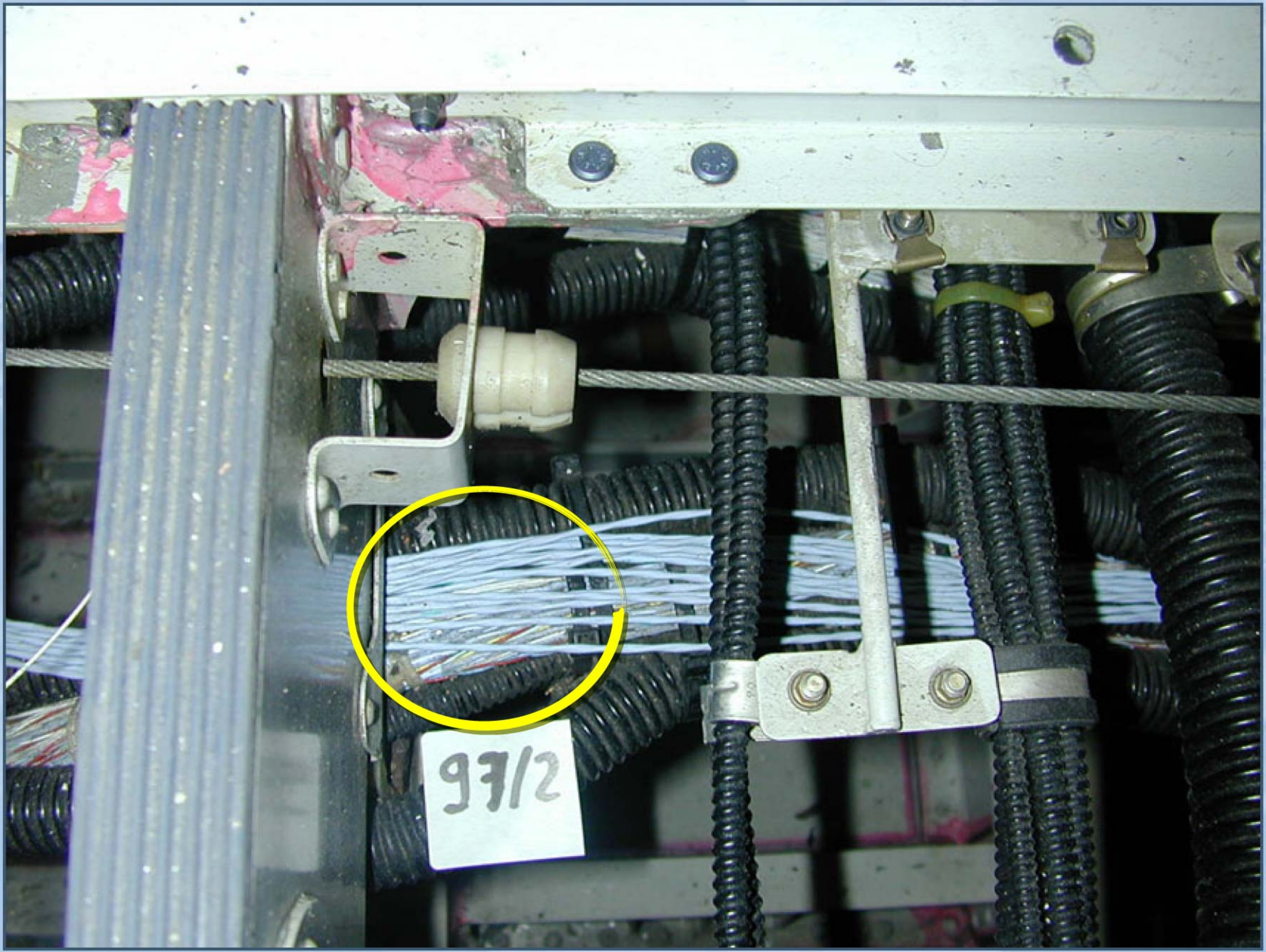

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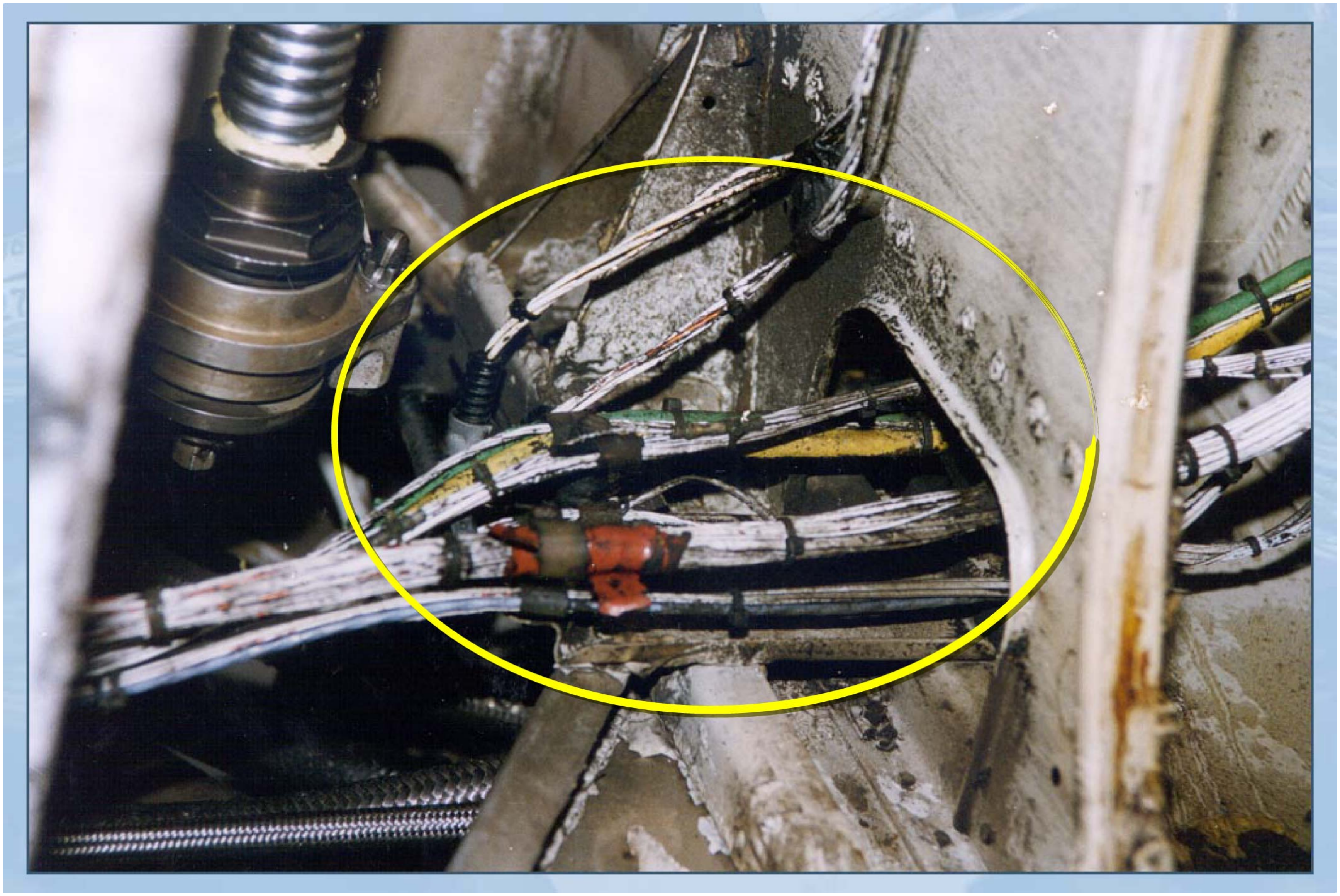

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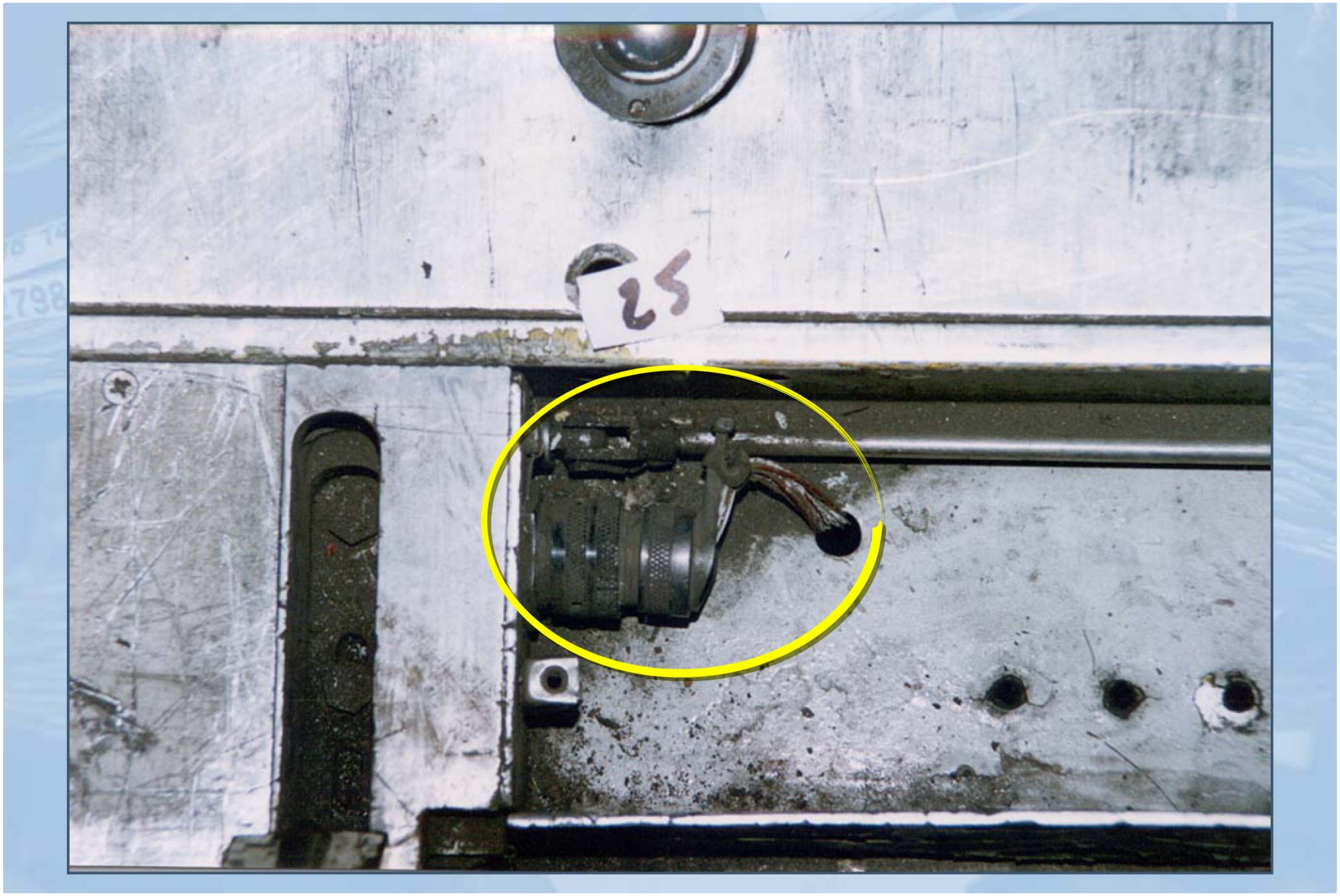

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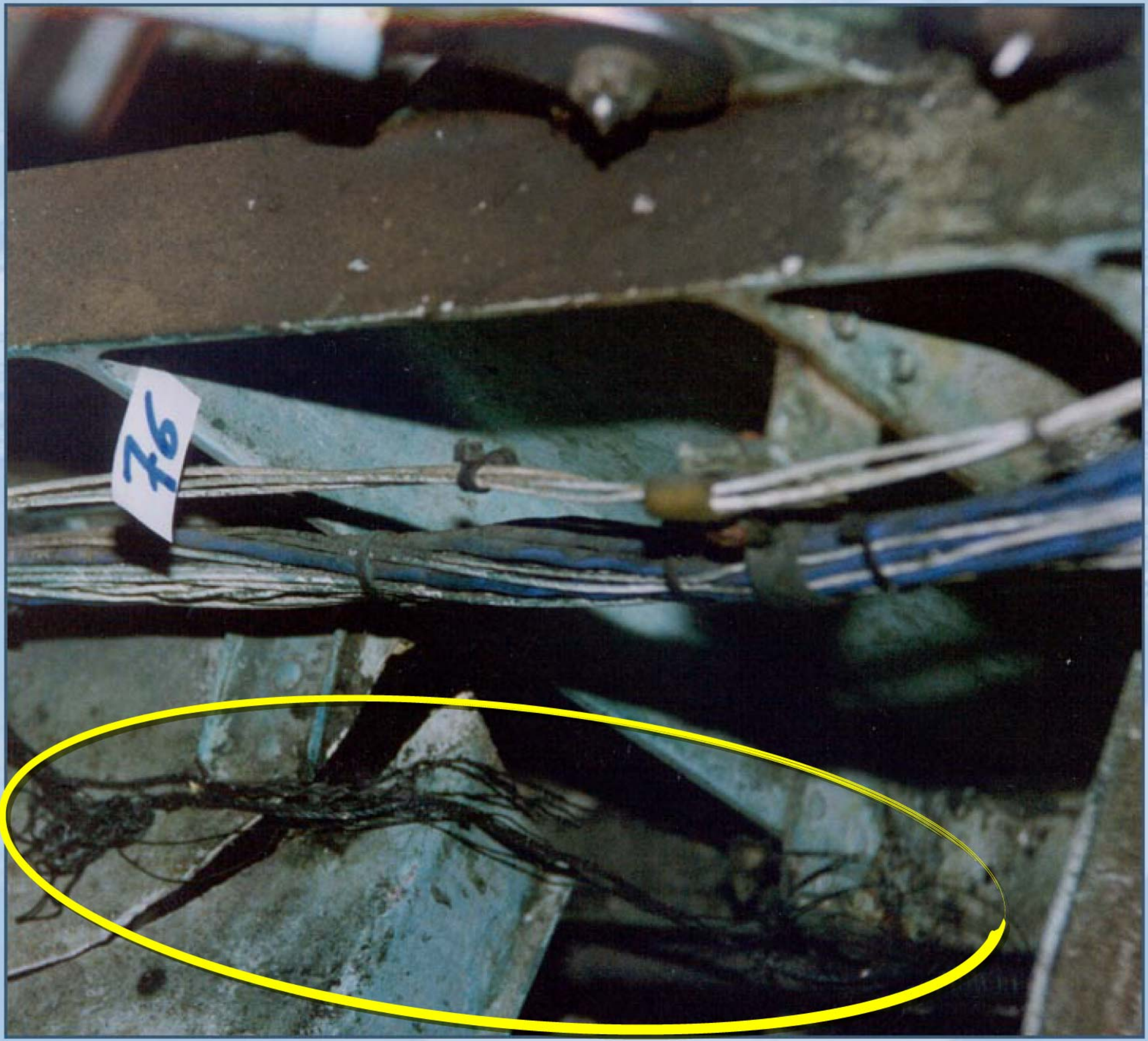

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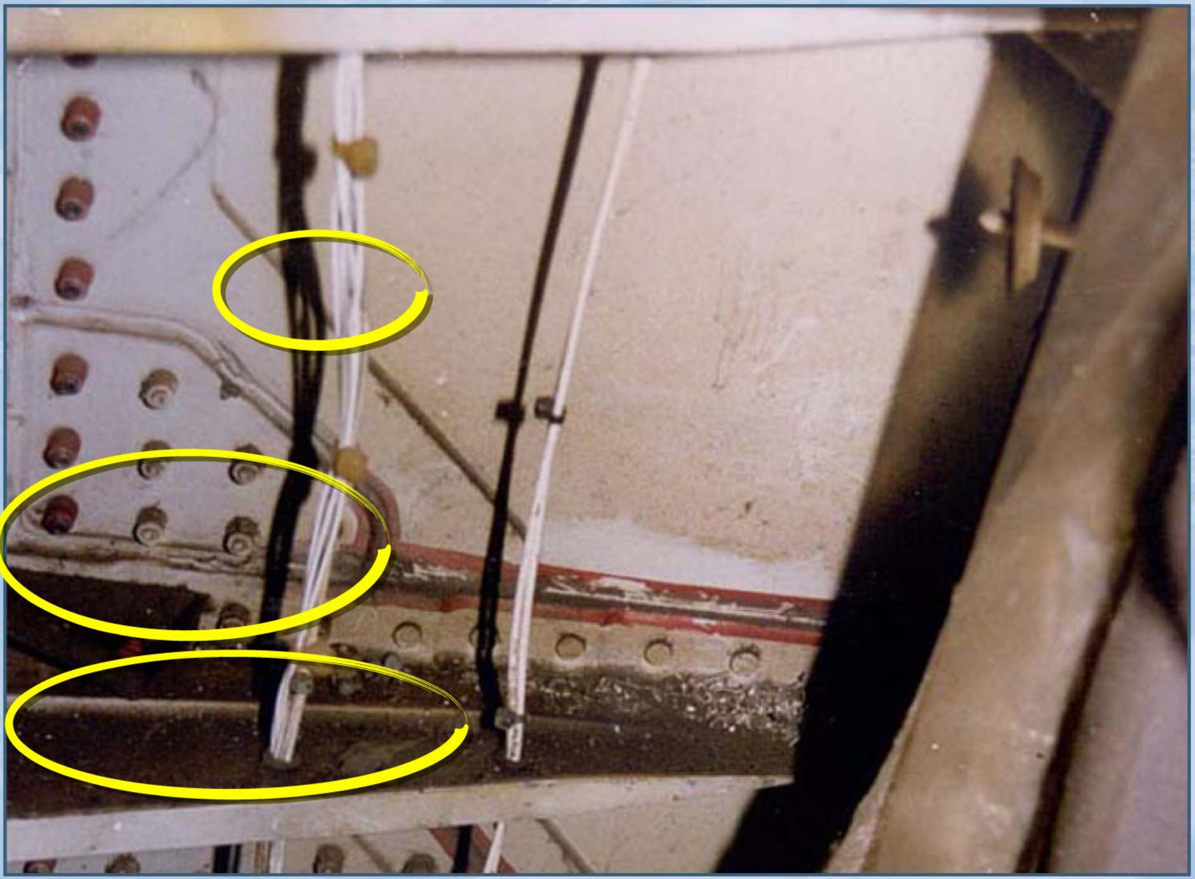

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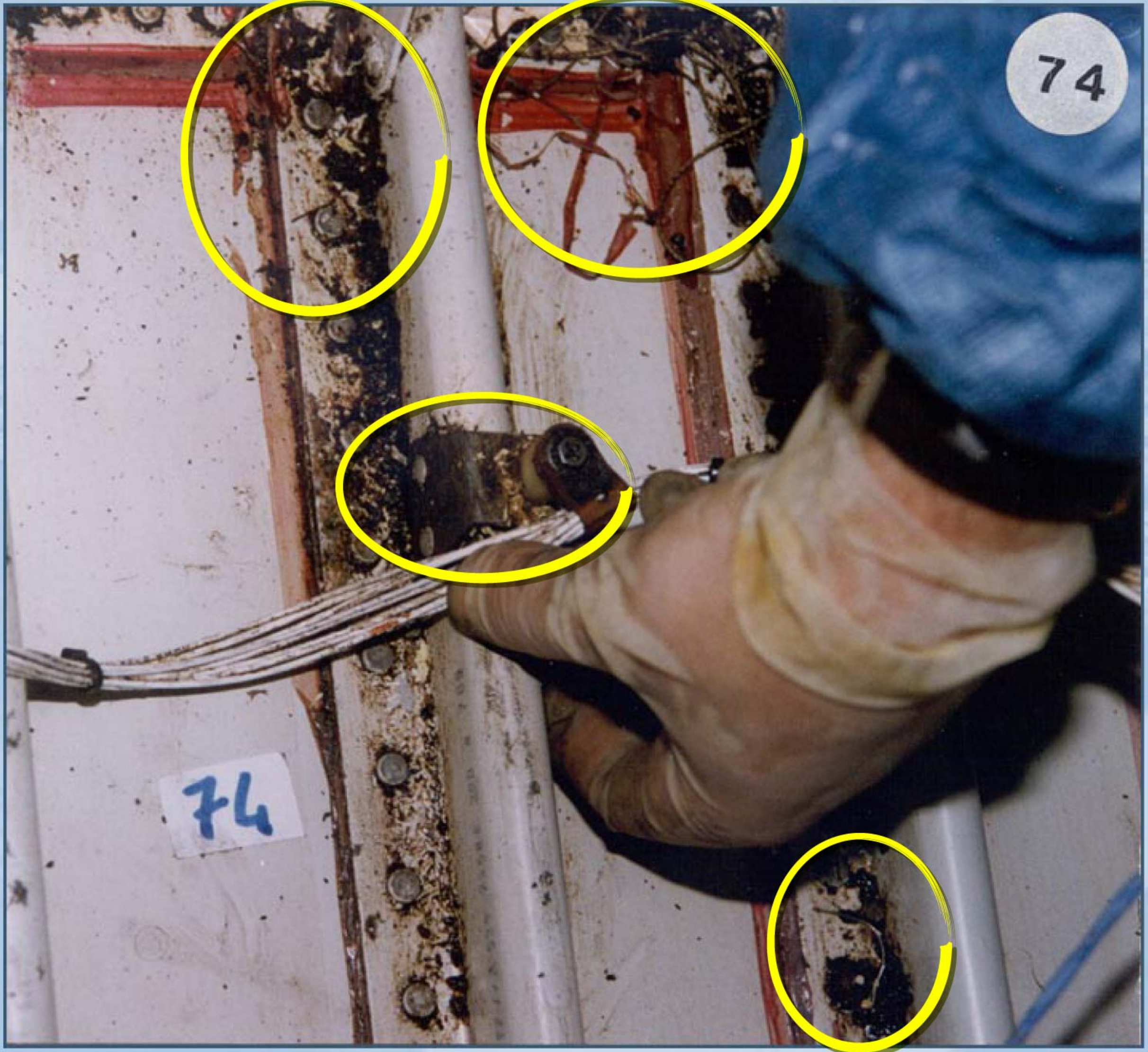

HOUSEKEEPING

HOUSEKEEPING

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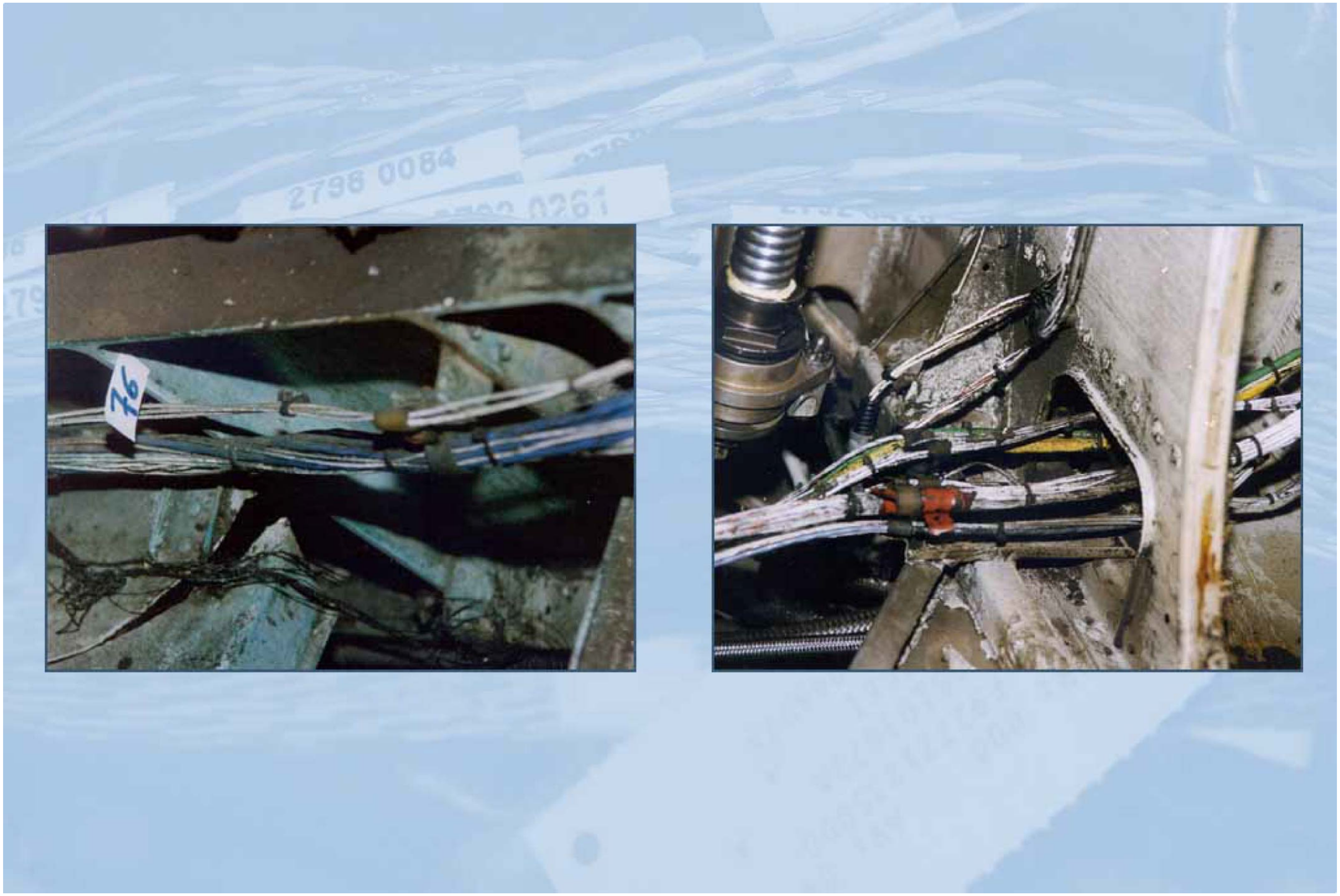
CONTAMINATION PROTECTION PLANNING

HOUSEKEEPING

This part gives you general guidelines concerning precautions to be taken during a maintenance operation.
When you have to perform a maintenance operation, you must first make sure that all the precautions have been taken, and then you obey to your local regulation.
Example: De-energize the aircraft, put the warning notices on.
You must also use the proper material to protect yourself. In the following example, look at the material you can use.
And as a general rule do not forget to read the relevant documentation about material warnings.
Set a protection all around the area. The plastic film maintained by an adhesive tape provides a protection from debris in order to avoid contamination from adjacent parts.
When you are done with your maintenance operation, you must check that you tidy away all the tools used in your toolbox. Then clean the area before removing the protection.
And clean your work area before removing the protection.
For example, if you drilled a hole, remove the swarf from the protection first.
Check the adjacent areas to make sure no contamination remains, and do not forget to clean as you go.
Now, to resume, do not forget to:
1) Protect yourself
2) Protect the aircraft (e.g. plastic films)
3) Perform the maintenance work
4) Clean the protection first
5) Remove the protection
6) Clean again the adjacent area
(Clean as you go philosophy)
GENERAL RECOMMENDATIONS
- An annual cleaning of electrical equipment to remove dust, dirt and grime is recommended,
- To correctly clean the area, it is recommended to have the proper lighting,
- To keep an area clean, for example, check the sealed band of the floor panels to make sure they are in a good shape.
CLEANING is a very IMPORTANT OPERATION because you can DISCOVER A DAMAGE in progress.
DON'T FORGET THAT.



HOUSEKEEPING

X8U08481 - X0332T0 - XM2020000000001

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
SAFETY PRACTICES - DESCRIPTION AND OPERATION

1. General

For work on an electrical system, it is necessary:
- to know and obey the standard safety practices,
- to have a good knowledge of the electrical standard practices,
- to have a good knowledge of requirements (processes, WARNINGS, CAUTIONS etc..) before you start the work.

This is necessary to prevent injury to persons and/or damage to equipment.

This document gives general safety practices for work on the aircraft electrical systems and parts of these systems such as: wires, wire routing, conduits, connections, splices, etc...
These safety practices do not replace local regulations specified by local authorities.

2. Maintenance

A. Electrical Safety Practices.

WARNING: BEFORE YOU DO WORK ON ELECTRICAL CABLES, MAKE SURE THAT THEY ARE NOT CONNECTED TO AN ELECTRICAL POWER SOURCE. THERE IS A RISK OF ELECTROCUTION IF AC OR DC POWER STAYS CONNECTED.

Before you start work on an electrical system or equipment, make sure that no electrical power is supplied to the system/equipment.
Open, safety and tag the circuit breaker(s) related to the system/equipment to prevent the supply of electrical power to the system/equipment during the maintenance work.
(Ref. Fig. 001)
This prevents the risk of:
- Electric shocks that can occur if you touch energized wiring connections, terminals, etc...
- Short circuits that can occur if metal tools or parts accidentally touch energized wiring, terminals, contacts, etc...

NOTE : Some circuits breakers (A320 family only) have a red threaded bush (P/N A92529086000). This bush prevents reset of the circuit breaker in flight (the crew cannot pull it).
If, for maintenance safety reasons, it is necessary to open such a circuit breaker, you can remove the red threaded bush with a standard wrench.

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AIRBUS

Customer : GEN Type : ALL Rev. Date : Apr 01/08	Manual: ESPM Selected effectivity: ALL

Figure 001 (Sheet 1) / 20-10-00 - Safety Practices - Typical Tag

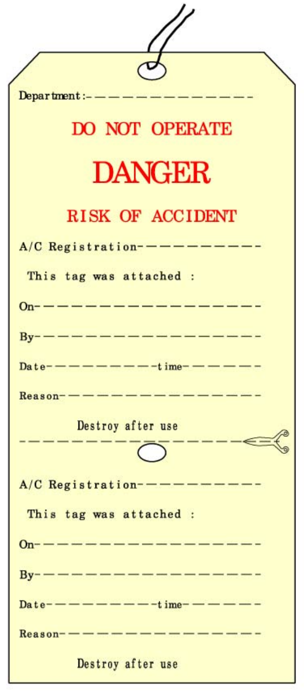

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Figure 001 (Sheet 1) / 20-10-00 - Safety Practices - Typical Tag

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HOUSEKEEPING

X8U08481 - X0332T0 - XM2020000000001

Protective Gloves

Cleaning Product

Protective Masks

Work Surfaces must be Cleaned

HOUSEKEEPING

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

B. Materials

WARNING: BEFORE YOU USE A MATERIAL REFERRED TO IN THIS PUBLICATION, YOU MUST KNOW ALL OF THE APPLICABLE PRECAUTIONS.
THESE PRECAUTIONS TELL YOU HOW TO:
- USE THE MATERIAL SAFELY,
- KEEP THE MATERIAL SAFELY,
- DISCARD THE MATERIAL SAFELY,
READ THE SAFETY DATA SHEETS FROM THE MANUFACTURER OR THE SUPPLIER OF THE MATERIAL TO LEARN THE RECOMMENDED PRECAUTIONS.
OBEY YOUR LOCAL REGULATIONS.

WARNING: USE SOLVENTS/CLEANING AGENTS, SEALANTS AND OTHER SPECIAL MATERIALS ONLY WITH A GOOD FLOW OF AIR THROUGH THE WORK AREA.
THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND ARE SKIN IRRITANTS.
OBEY THE MANUFACTURERS INSTRUCTIONS.
PUT ON PROTECTIVE CLOTHING.
DO NOT GET THEM IN YOUR MOUTH.
DO NOT SMOKE.
DO NOT BREATHE THE GAS.
GET MEDICAL HELP IF YOUR SKIN OR EYES BECOME IRRITATED.

C. Tools

WARNING: BE CAREFUL WHEN YOU USE ELECTRIC HAND TOOLS ON THE AIRCRAFT.
IF THERE ARE LOCAL REGULATIONS RELATED TO ELECTRIC HAND TOOLS, MAKE SURE THAT YOU OBEY THEM.

R Never use electric tools which deliver an energy of more than 0.02
R millijoule in fuel tanks or in areas where there are flammable vapors.
Never use heat-generating tools in the fuel tanks or in areas where there are flammable vapors.
Use only crimp-type contacts, terminals, splices, sleeves (non-heat shrinkable sleeves) in these areas.

R D. Cables
R For cables in harnesses that are identified by a P/N (engine, landing
R gear, fuel tanks, etc...), also refer to the applicable manufacturer
R documentation (CMM).

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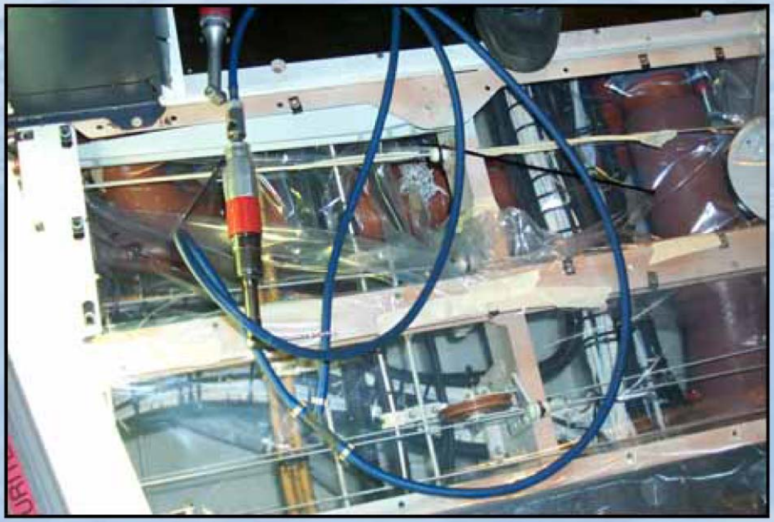
HOUSEKEEPING



HOUSEKEEPING

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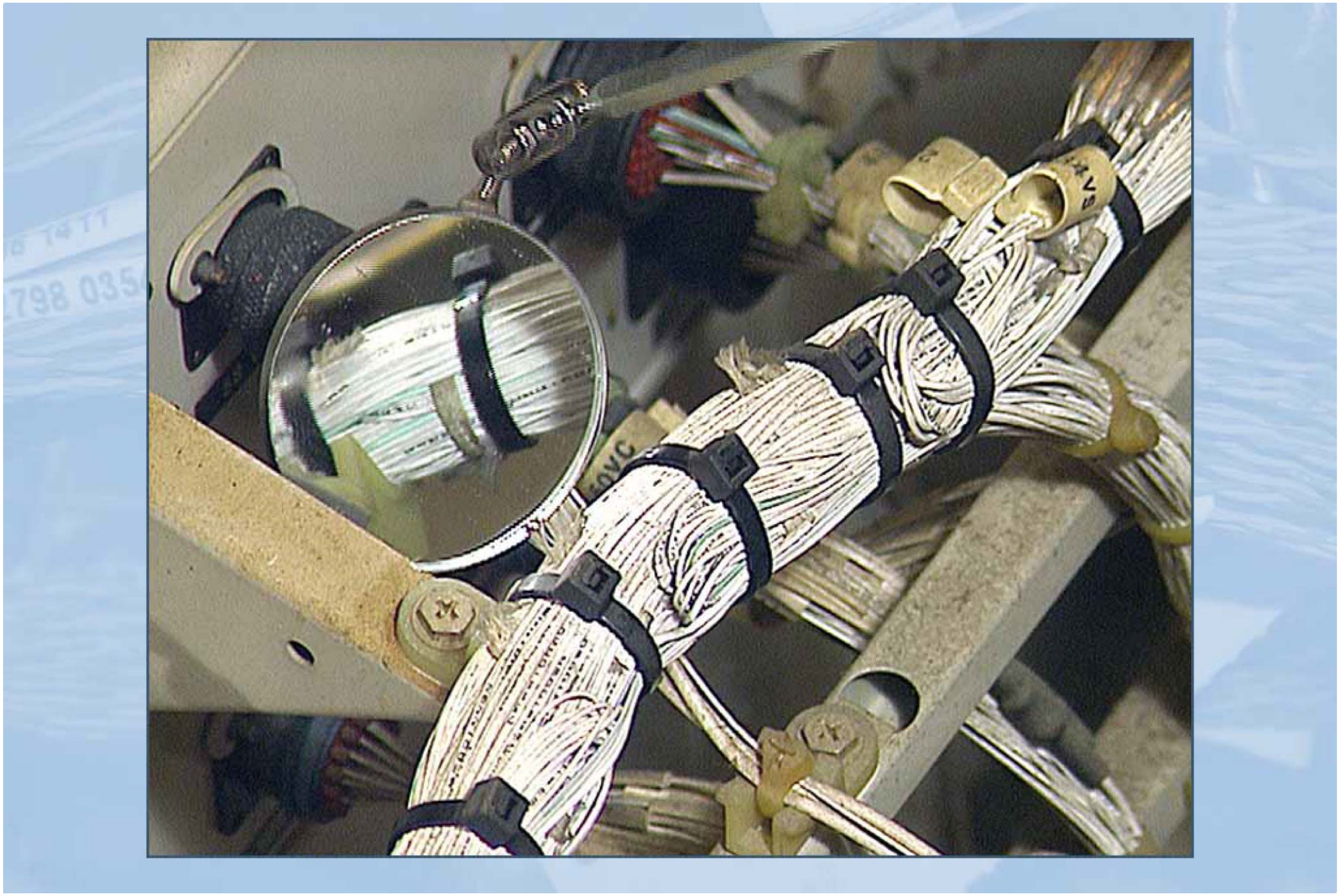

HOUSEKEEPING

Now, to resume, do not forget to:

1) Protect yourself

2) Protect the aircraft (e.g. plastic films)

3) Perform the maintenance work

4) Clean the protection first

5) Remove the protection

6) Clean again the adjacent area
(Clean as you go philosophy)

HOUSEKEEPING

X8U08481 - X0332T0 - XM2020000000001

GENERAL RECOMMANDATIONS

An annual cleaning of electrical equipment to remove dust, dirt and grime is recommended

To correctly clean the area, it is recommended to have the proper lighting

To keep an area clean, for example, check the sealed band of the floor panels to make sure they are in a good shape

HOUSEKEEPING

HOUSEKEEPING

HOUSEKEEPING

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CLEANING PROCESSES

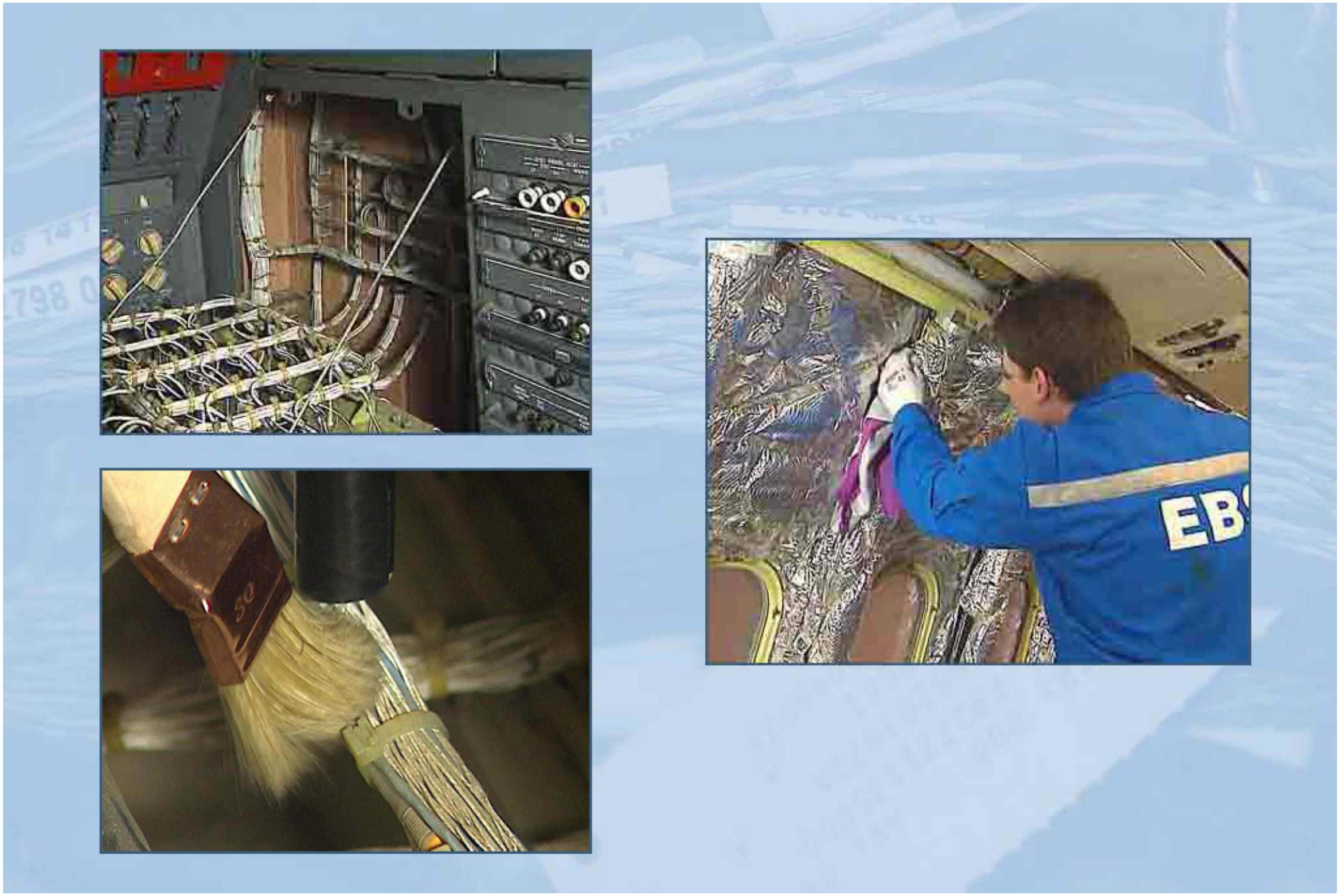
GENERAL CLEANING

Cleaning of electrical installation on aircraft.
Contamination can be internal or external.
Internal contamination:
This type of contamination is an identified material used in the aircraft systems (hydraulic fluid, fuel, etc...)
External contamination:
This type of contamination agent comes from an external source (coffee, miscellaneous liquids carried on aircraft, metal shaving, etc...)
Following safety practices during cleaning operation is mandatory.
Sequence of actions:
- Stop the contamination source.
- Keep the contaminated area to a minimum.
- Apply the correct cleaning procedure

Liquid contamination example:
- Stop the contamination source.
- Make a sealed barrier.
- Remove liquid with vacuum cleaner for liquids.

For powder or granular or dust contamination, you must ensure there is no draught (wind) and remove the contamination with a vacuum cleaner and a soft brush.
For external contamination, you have to make an estimate of the risk of deterioration of electrical item (some agents can cause damage to the polymers used in electrical items).
In case of damage due to the contamination agent, refer to this table know if:
- you can clean the item.
- you must replace the item.

Typical cleaning method.
Precautions:
Always start cleaning from the periphery to the center or from the top to the bottom of the area.
When using cleaning agents, do a test to ensure the product give satisfactory result.
When you use a cloth, make sure it is clean, dry and lint-free.
When you use a vacuum cleaner, make sure the filter is in position and its outlet is out of the aircraft.
Always use a small capacity can in the aircraft and always put the cleaning agent on the cloth.
This table gives you the type of cleaning agent you must use.



GENERAL CLEANING

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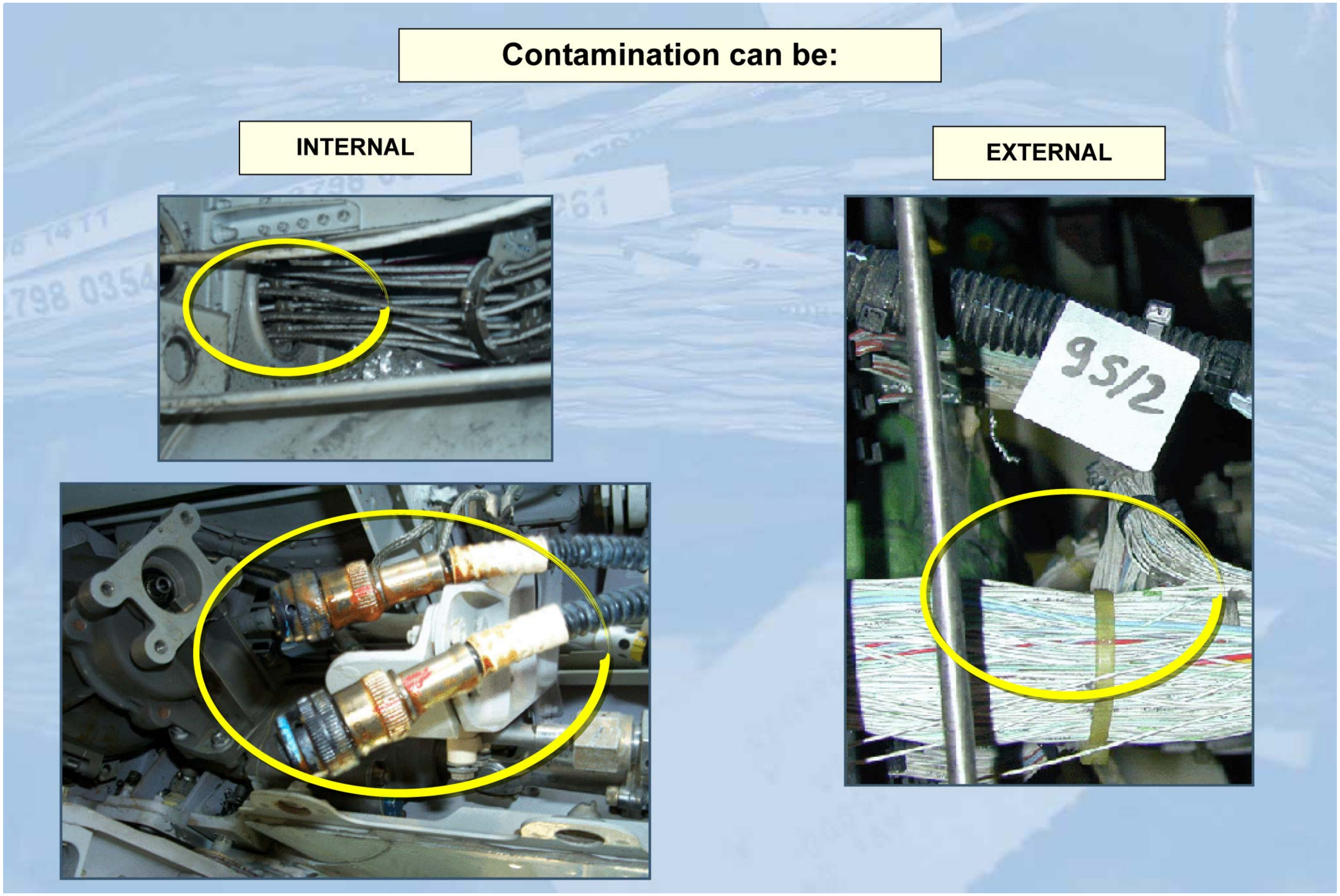

GENERAL CLEANING

INTERNAL CONTAMINATION

GENERAL CLEANING

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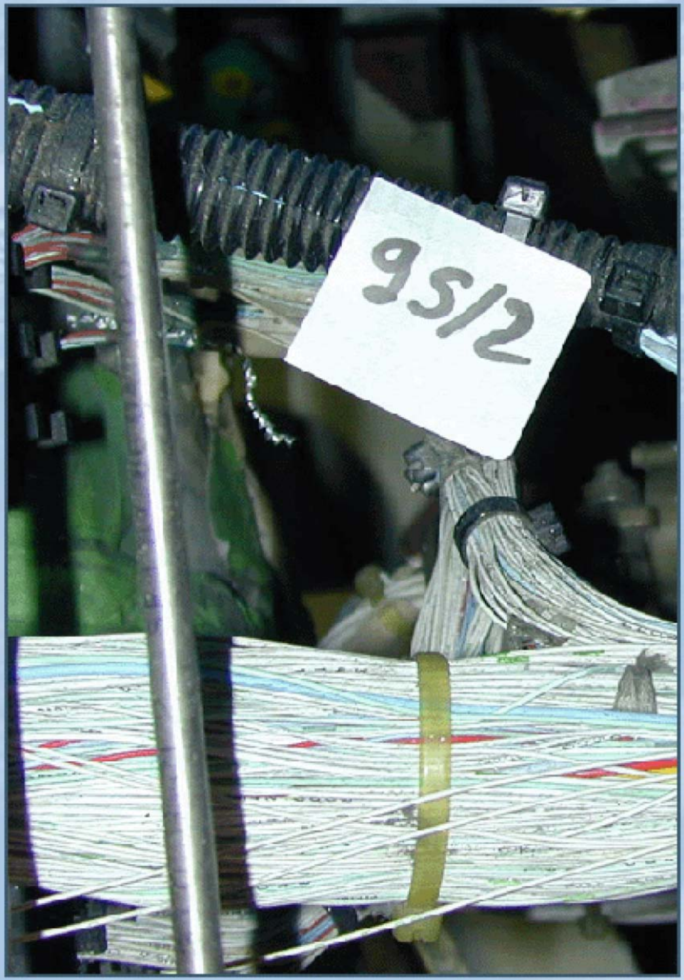
EXTERNAL CONTAMINATION



GENERAL CLEANING

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20-55-10 - GENERAL CLEANING (Airbus)	

GENERAL CLEANING (Airbus)

GENERAL CLEANING - DESCRIPTION AND OPERATION

1. General

This chapter gives the general instructions related to the cleaning of electrical components that have contamination.
The contamination can be:
- natural: the contamination agent is an identified material used in the aircraft systems (hydraulic fluid, fuel, etc.),
- accidental: the contamination agent comes from an external source (cleaning agent, etc.),
- the effect of ageing: the contamination agent is dust, lint or fluff.

WARNING: BEFORE YOU USE A MATERIAL REFERRED TO IN THIS PUBLICATION, YOU MUST KNOW ALL OF THE APPLICABLE PRECAUTIONS.
THESE PRECAUTIONS TELL YOU HOW TO:
- **USE THE MATERIAL SAFELY,**
- **KEEP THE MATERIAL SAFELY,**

READ THE SAFETY DATA SHEETS FROM THE MANUFACTURER OR THE SUPPLIER OF THE MATERIAL TO LEARN THE RECOMMENDED PRECAUTIONS. OBEY YOUR LOCAL REGULATIONS.

WARNING: USE SOLVENTS/CLEANING AGENTS, SEALANTS AND OTHER SPECIAL MATERIALS ONLY WITH A GOOD FLOW OF AIR THROUGH THE WORK AREA.
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PUT ON PROTECTIVE CLOTHING.
DO NOT GET THEM IN YOUR MOUTH.
DO NOT SMOKE.
DO NOT BREATHE THE GAS.
GET MEDICAL HELP IF YOUR SKIN OR EYES BECOME IRRITATED.

2. Safety Pract
3. Procedure

A. In relati

B. Type of

(1) Liq

- remove the contamination with cloth or a vacuum cleaner for liquids.

(2) Dry Contamination : dust, lint, fluff, powder and granular contamination
On wires and electrical items, dry contamination can :
- Prevent correct inspections.
- Cause fire propagation after a short-circuit or arcing.
Do these actions to clean the contamined area(s) :
- make sure that there are no draughts.
- remove the contamination with a vacuum cleaner.

C. Analysis of Accidental Contamination

If the contamination is accidental, find the characteristics of the contamination agent (Refer to the material manufacturer's documentation).
You must make an estimate of the risk of deterioration of the electrical items.
Some contamination agents can cause damage to the polymers used in the electrical items.
There can be a change in the electrical performance (insulation resistance, dielectric strength.).
Refer to the table to know if:
- you can clean the items.
- you must replace the items.

(1) Visually examine the area that has contamination
Examine the electrical items that have contamination for traces of damage.

Type of Damage	Procedure
- Discoloration (connectors, terminal blocks, modules, bases, etc.). - Cracks.	Replace the electrical item.
- Expansion of the sealing	Replace the electrical item.

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GENERAL CLEANING

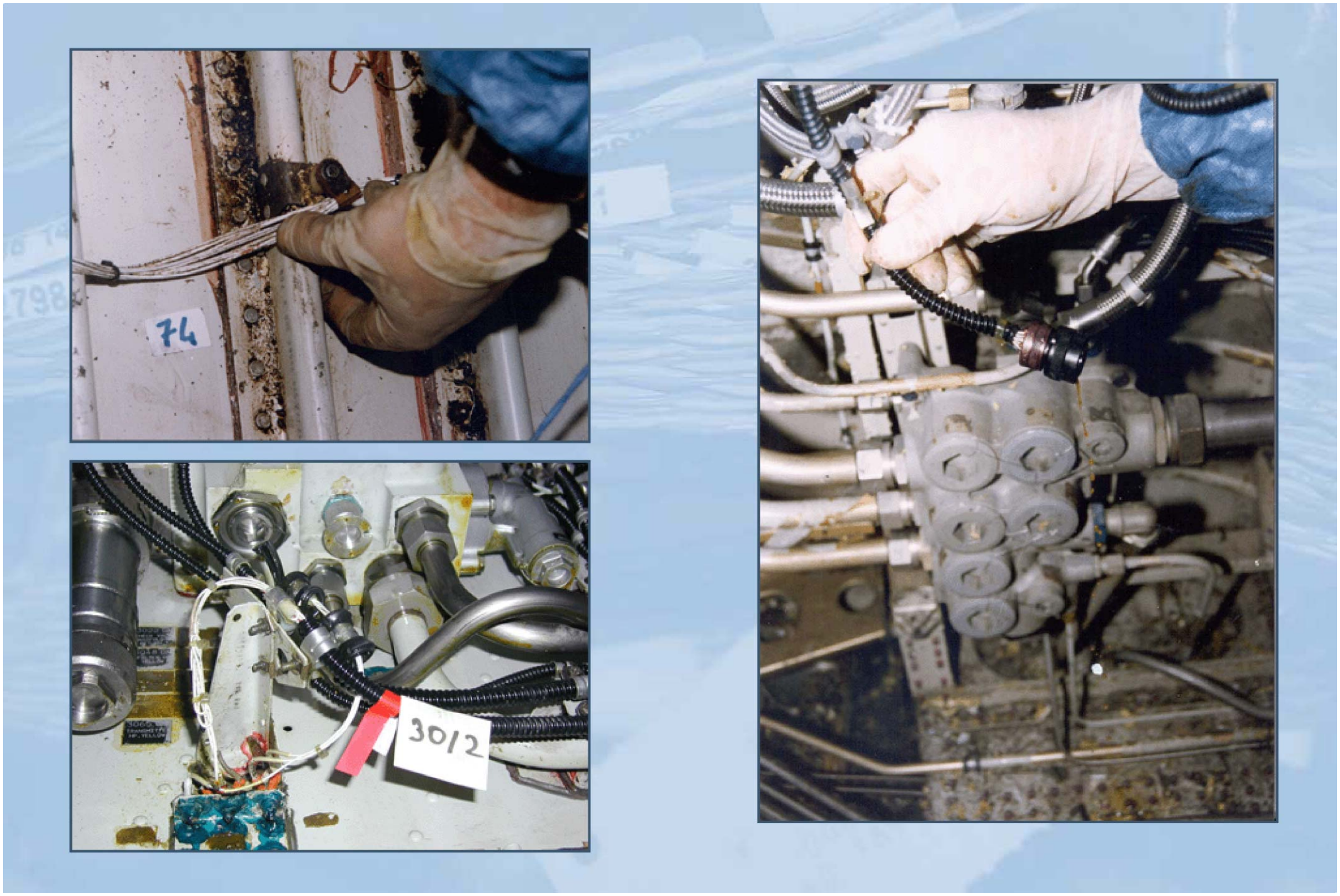
Typical STEPS to FOLLOW

Stop contamination source

Keep the contaminated area to a minimum

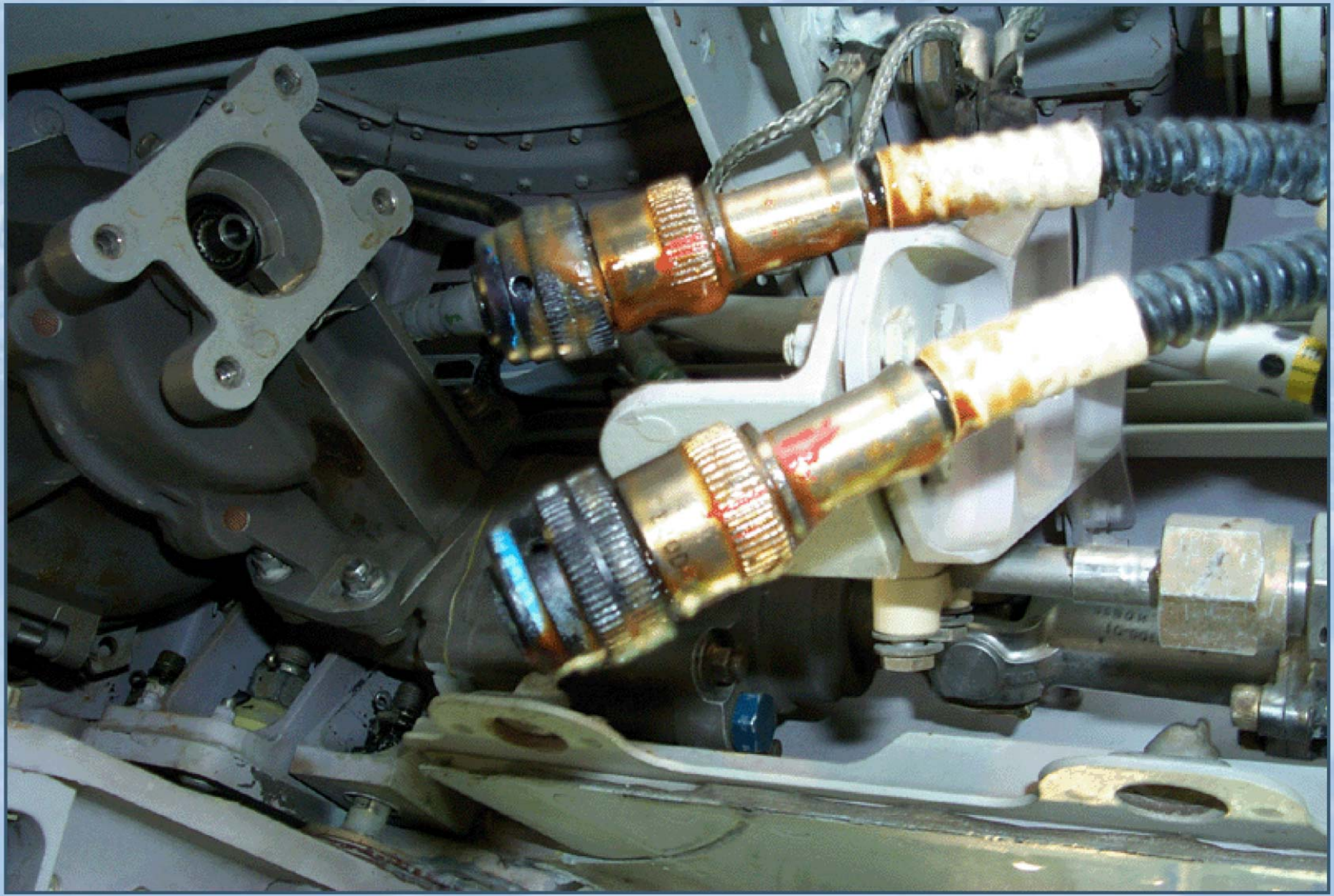
Clean

GENERAL CLEANING

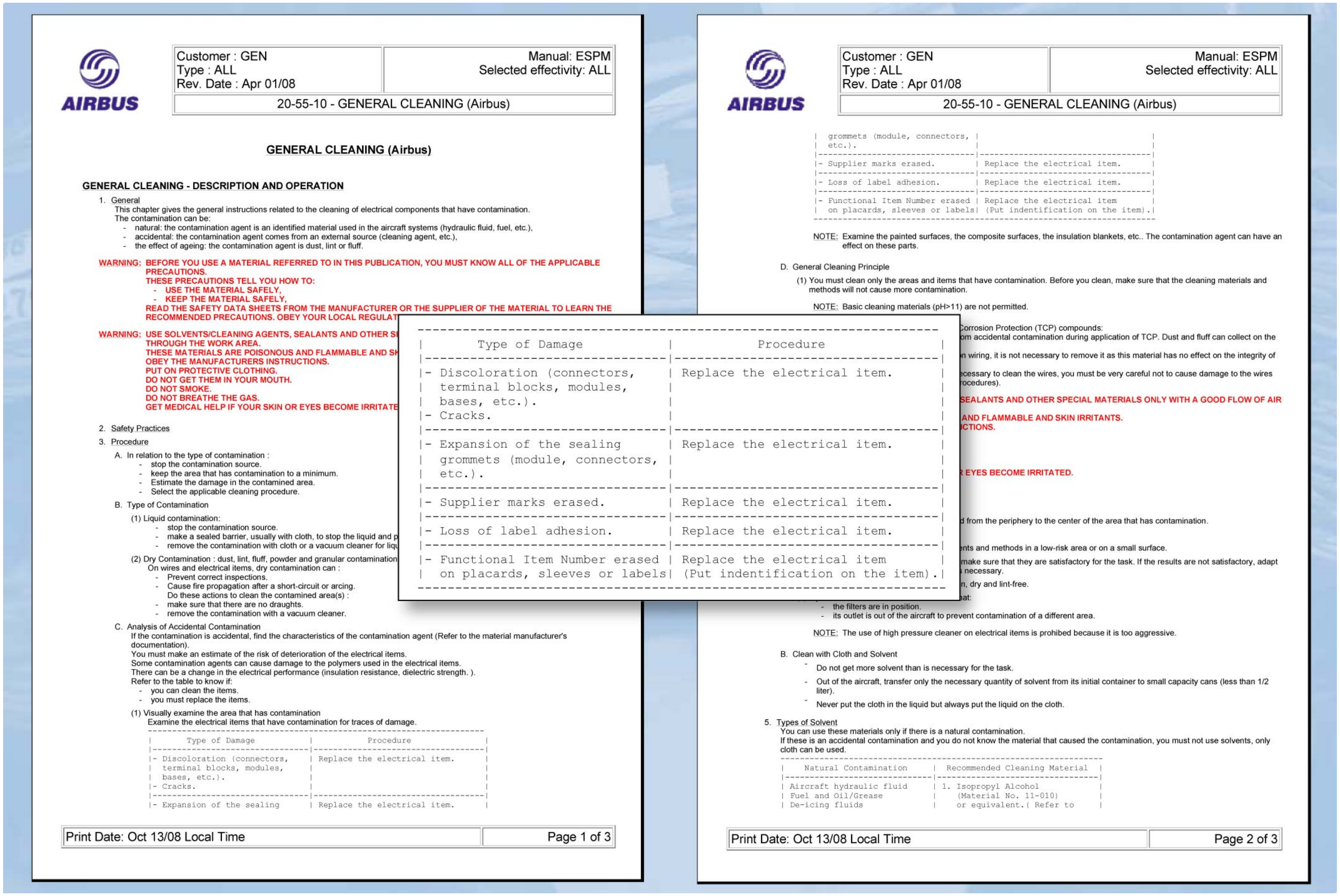


GENERAL CLEANING

GENERAL CLEANING



GENERAL CLEANING



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Selected effectivity: ALL

20-55-10 - GENERAL CLEANING (Airbus)

GENERAL CLEANING (Airbus)

GENERAL CLEANING - DESCRIPTION AND OPERATION

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The contamination can be:
- natural: the contamination agent is an identified material used in the aircraft systems (hydraulic fluid, fuel, etc.),
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2. Safety Practices

3. Procedure

A. In relation to the type of contamination :
- stop the contamination source.
- keep the area that has contamination to a minimum.
- Estimate the damage in the contamined area.
- Select the applicable cleaning procedure.

B. Type of Contamination

(1) Liquid contamination:
- stop the contamination source.
- make a sealed barrier, usually with cloth, to stop the liquid and p
- remove the contamination with cloth or a vacuum cleaner for liqu

(2) Dry Contamination : dust, lint, fluff, powder and granular contamination
On wires and electrical items, dry contamination can :
- Prevent correct inspections.
- Cause fire propagation after a short-circuit or arcing.
Do these actions to clean the contamined area(s) :
- make sure that there are no draughts.
- remove the contamination with a vacuum cleaner.

C. Analysis of Accidental Contamination
If the contamination is accidental, find the characteristics of the contamination agent (Refer to the material manufacturer's documentation).
You must make an estimate of the risk of deterioration of the electrical items.
Some contamination agents can cause damage to the polymers used in the electrical items.
There can be a change in the electrical performance (insulation resistance, dielectric strength.).
Refer to the table to know if:
- you can clean the items.
- you must replace the items.

(1) Visually examine the area that has contamination
Examine the electrical items that have contamination for traces of damage.

Type of Damage	Procedure
- Discoloration (connectors, terminal blocks, modules, bases, etc.). - Cracks.	Replace the electrical item.
- Expansion of the sealing	Replace the electrical item.

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Type of Damage	Procedure
- Discoloration (connectors, terminal blocks, modules, bases, etc.). - Cracks.	Replace the electrical item.
- Expansion of the sealing grommets (module, connectors, etc.).	Replace the electrical item.
- Supplier marks erased.	Replace the electrical item.
- Loss of label adhesion.	Replace the electrical item.
- Functional Item Number erased on placards, sleeves or labels	Replace the electrical item (Put indentification on the item).

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Selected effectivity: ALL

20-55-10 - GENERAL CLEANING (Airbus)

Type of Damage	Procedure
grommets (module, connectors, etc.).	
- Supplier marks erased.	Replace the electrical item.
- Loss of label adhesion.	Replace the electrical item.
- Functional Item Number erased on placards, sleeves or labels	Replace the electrical item (Put indentification on the item).

NOTE: Examine the painted surfaces, the composite surfaces, the insulation blankets, etc.. The contamination agent can have an effect on these parts.

D. General Cleaning Principle

(1) You must clean only the areas and items that have contamination. Before you clean, make sure that the cleaning materials and methods will not cause more contamination.

NOTE: Basic cleaning materials (pH>11) are not permitted.

Corrosion Protection (TCP) compounds:
om accidental contamination during application of TCP. Dust and fluff can collect on the
n wiring, it is not necessary to remove it as this material has no effect on the integrity of
ecessary to clean the wires, you must be very careful not to cause damage to the wires
rocedures).

SEALANTS AND OTHER SPECIAL MATERIALS ONLY WITH A GOOD FLOW OF AIR
AND FLAMMABLE AND SKIN IRRITANTS.
ICTIONS.
R EYES BECOME IRRITATED.

d from the periphery to the center of the area that has contamination.
nts and methods in a low-risk area or on a small surface.
make sure that they are satisfactory for the task. If the results are not satisfactory, adapt
s necessary.
n, dry and lint-free.
at:
- the filters are in position.
- its outlet is out of the aircraft to prevent contamination of a different area.

NOTE: The use of high pressure cleaner on electrical items is prohibed because it is too aggressive.

B. Clean with Cloth and Solvent
- Do not get more solvent than is necessary for the task.
- Out of the aircraft, transfer only the necessary quantity of solvent from its initial container to small capacity cans (less than 1/2 liter).
- Never put the cloth in the liquid but always put the liquid on the cloth.

5. Types of Solvent
You can use these materials only if there is a natural contamination.
If these is an accidental contamination and you do not know the material that caused the contamination, you must not use solvents, only cloth can be used.

Natural Contamination	Recommended Cleaning Material
Aircraft hydraulic fluid Fuel and Oil/Grease De-icing fluids	1. Isopropyl Alcohol (Material No. 11-010) or equivalent.(Refer to

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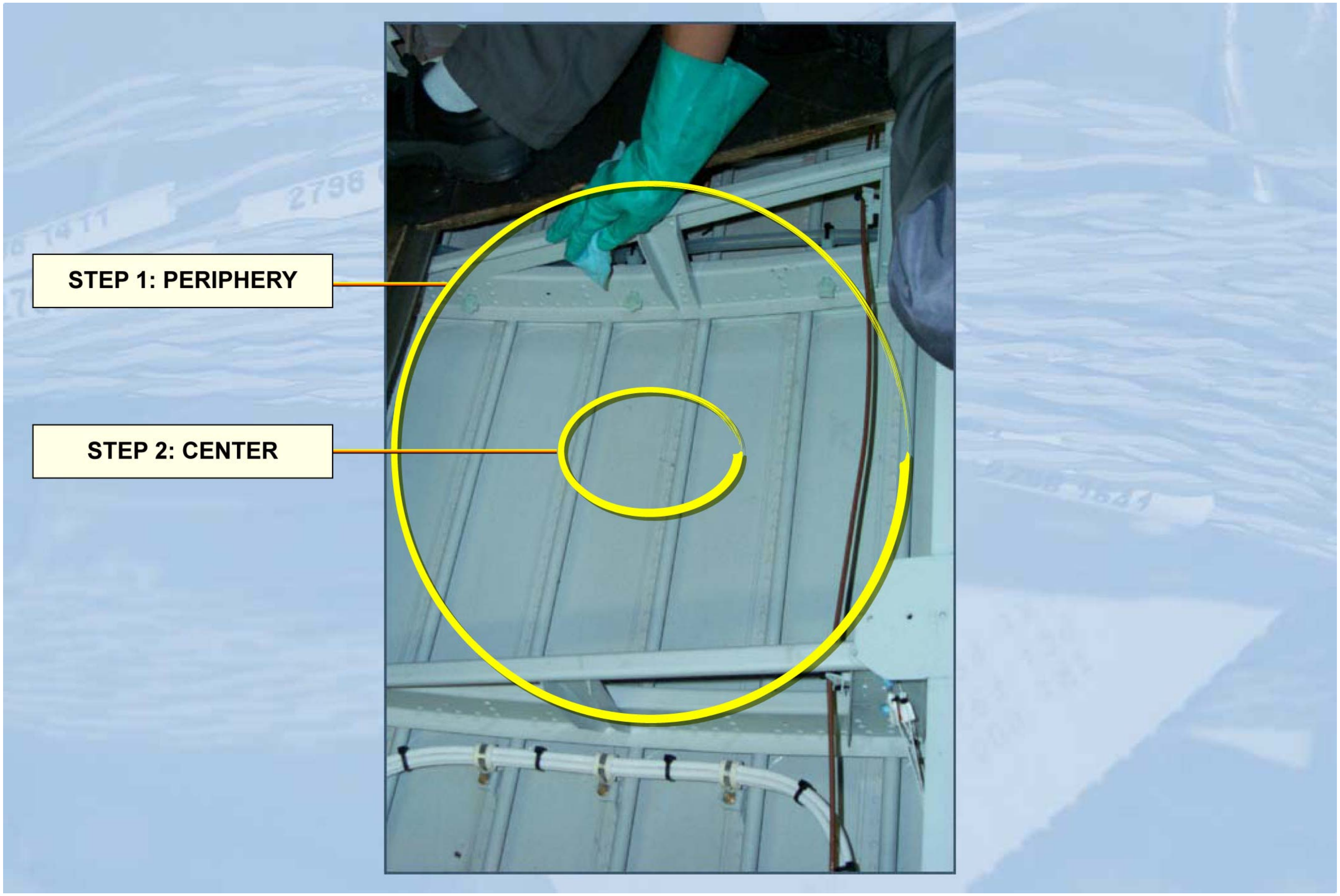
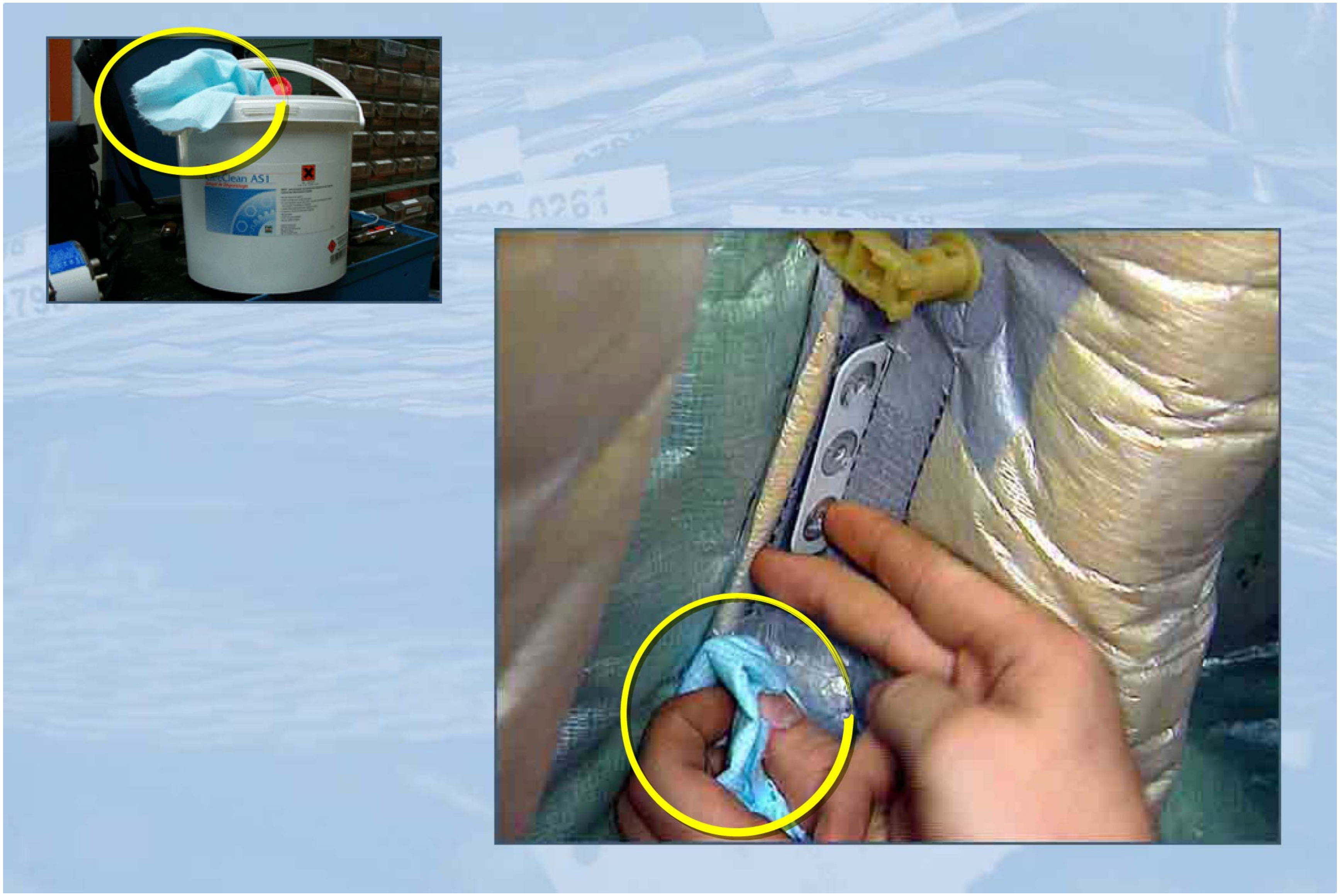
GENERAL CLEANING

GENERAL CLEANING



GENERAL CLEANING

GENERAL CLEANING



GENERAL CLEANING

GENERAL CLEANING

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grommets (module, connectors, etc.).	
- Supplier marks erased.	Replace the electrical item.
- Loss of label adhesion.	Replace the electrical item.
- Functional Item Number erased on placards, sleeves or labels	Replace the electrical item (Put indentification on the item).

NOTE: Examine the painted surfaces, the composite surfaces, the insulation blankets, etc.. The contamination agent can have an effect on these parts.

D. General Cleaning Principle

(1) You must clean only the areas and items that have contamination. Before you clean, make sure that the cleaning materials and methods will not cause more contamination.

NOTE: Basic cleaning materials (pH>11) are not permitted.

(2) In case of contamination with Temporary Corrosion Protection (TCP) compounds:
We recommend protection of the wires from accidental contamination during application of TCP. Dust and fluff can collect on the wire if the surface stays tacky.
However, if you accidentally apply TCP on wiring, it is not necessary to remove it as this material has no effect on the integrity of

wires

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, only

Aircraft hydraulic fluid Fuel and Oil/Grease De-icing fluids	1. Isopropyl Alcohol (Material No. 11-010) or equivalent.(Refer to

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20-55-10 - GENERAL CLEANING (Airbus)

Natural Contamination	Recommended Cleaning Material
Aircraft hydraulic fluid Fuel and Oil/Grease De-icing fluids	1. Isopropyl Alcohol (Material No. 11-010) or equivalent.(Refer to the local regulations) 2. Equivalent to Trichloroethane T.1.1.1 : CARECLEAN AS1 (Material No. 11-026A) DIESTONE D (Material No. 11-026D) ISOPAR H (Material No. 11-026B)
Anti-corrosion material Dust	
Accidental contamination	To be treated on a case-by-case basis dependent on the chemical nature of the material

NOTE: For PEI ABS0678 cable supports, only Isopropyl alcohol can be used. The use of Trichloroethane or an equivalent product is prohibed.

GENERAL CLEANING

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CLEANING PROCESSES

CLEANING OF WIRES

Cleaning of wires.
Clean with vacuum cleaner and a soft brush to remove dust particles and a sponge to remove liquids on the bundle surface.
Click here to start the movie
After surface cleaning check if the contamination agent goes deep between the wires by removing the cable ties.
After removing of the cable ties to allow a correct cleaning reinstall new cables ties.
If contamination goes inside the bundle, clean the wires one by one.
For wires with NOMEX insulation, check the drying correctly because this insulation type can operate like a wick.
When there is wick phenomenon, replace the wire at the next C-check because of the risk of delaminating. If delaminating has begun, change the wire.

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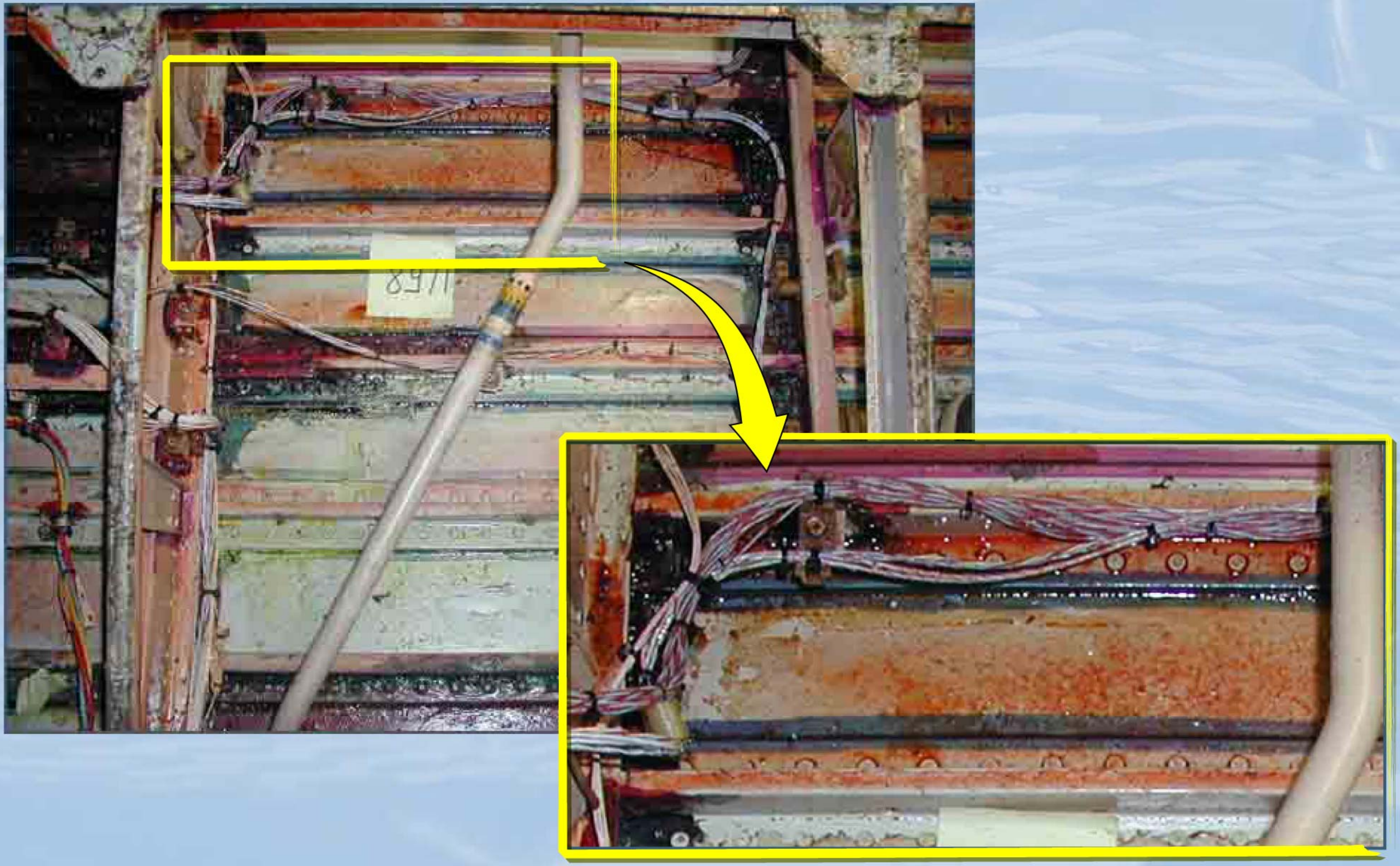
CLEANING OF WIRES

CLEANING OF WIRES

CLEANING OF WIRES



CLEANING OF WIRES

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CLEANING OF WIRES

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CLEANING OF WIRES (Airbus)

CLEANING OF WIRES - DESCRIPTION AND OPERATION

1. General
   This chapter gives the instructions related to the cleaning of cables that have surface contamination or in-depth contamination. The CML codes of the cleaning products are given in 20-55-10.

CAUTION: DO NOT USE THESE PROCESSES FOR THE CABLES IN HARNESSES IDENTIFIED BY A PART NUMBER (CABLES FOR ENGINES, LANDING GEAR, FUEL TANKS, APU, ETC., BUT NOT FOR THE A380 PEPDC OR SEPDC'S). REFER TO THE RELATED VENDOR (OR MANUFACTURER'S) DOCUMENTATION.

2. Cleaning

   NOTE: To prevent more contamination or possible fire propagation, it is necessary to clean also the area adjacent to the wiring (removal of dust on blankets, supports or brackets and related items).

   - Use suction to remove the particles or a sponge to remove the liquids from the surface of the bundles.
   - Locally remove the ties in the area that has contamination (300 mm (11.8110 in.) approx). Estimate if the contamination is on the surface or deeper (the contamination agent goes deep in the bundle).

   A. Surface Contamination
      - Do not remove the cable ties.
      - Clean the bundles with a dry cloth or with a cloth moist with solvent. If you use a solvent, let it operate during 10 seconds then clean again with a dry cloth.
      - Install new cable ties in the cleaned area.
      - Remove the old ties and clean their location.

      NOTE: When the ties hold the bundle on supports, do not remove all the ties at the same time.
      Replace the ties support by support.
      Install a new cable tie at the same location.
      Clean the support or replace it if necessary.

   B. Deep Contamination
      - Do the procedure on one bundle only at a time and on a small length.
      - Remove the support ties first, then the others.
      - Clean the cables one by one on the prepared length.
      - Install the cable ties (maximum pitch: 150 mm (5.9055 in.) ; 100 mm (3.9370 in.) on the last 500 mm (19.6850 in.)).
      - Install the bundle at its original location except at the two ends of the cleaned length. This is to make an overlap when you clean the subsequent section.
      - Make new identification if necessary.

   C. Special Conditions
      (1) Aluminum cables NSA935308YU, E0438YV and E0471QP.
      The Polyamid Aromatic (NOMEX) braid can operate like a wick. Make sure that the drying

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20-55-20 - CLEANING OF WIRES (Airbus)	

operation is correct.
If basic materials (pH>11) caused the contamination, the polyimide insulation can have damage.
If there is this type of damage, it is better to fully replace the feeder.

CLEANING OF WIRES

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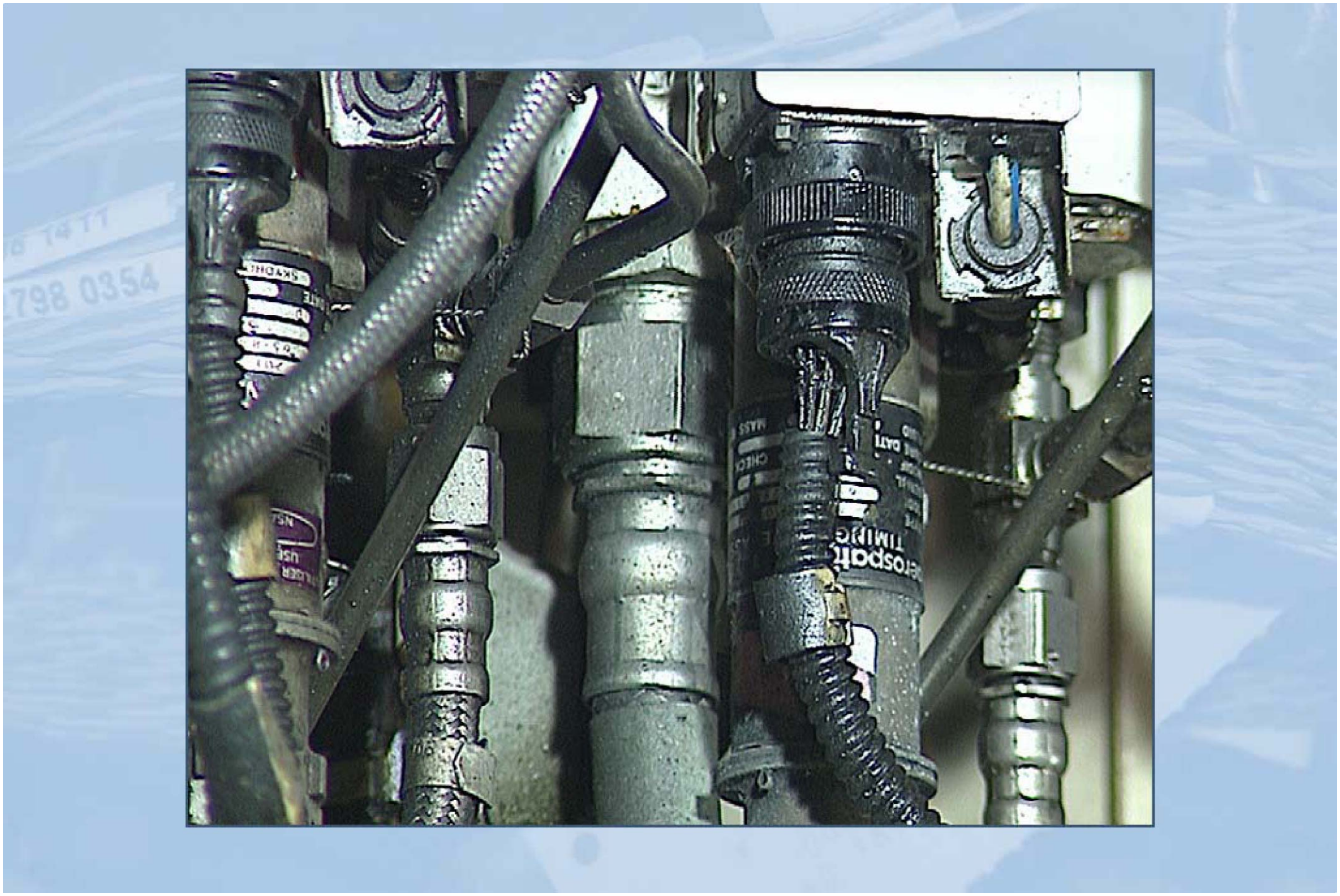
CLEANING PROCESSES

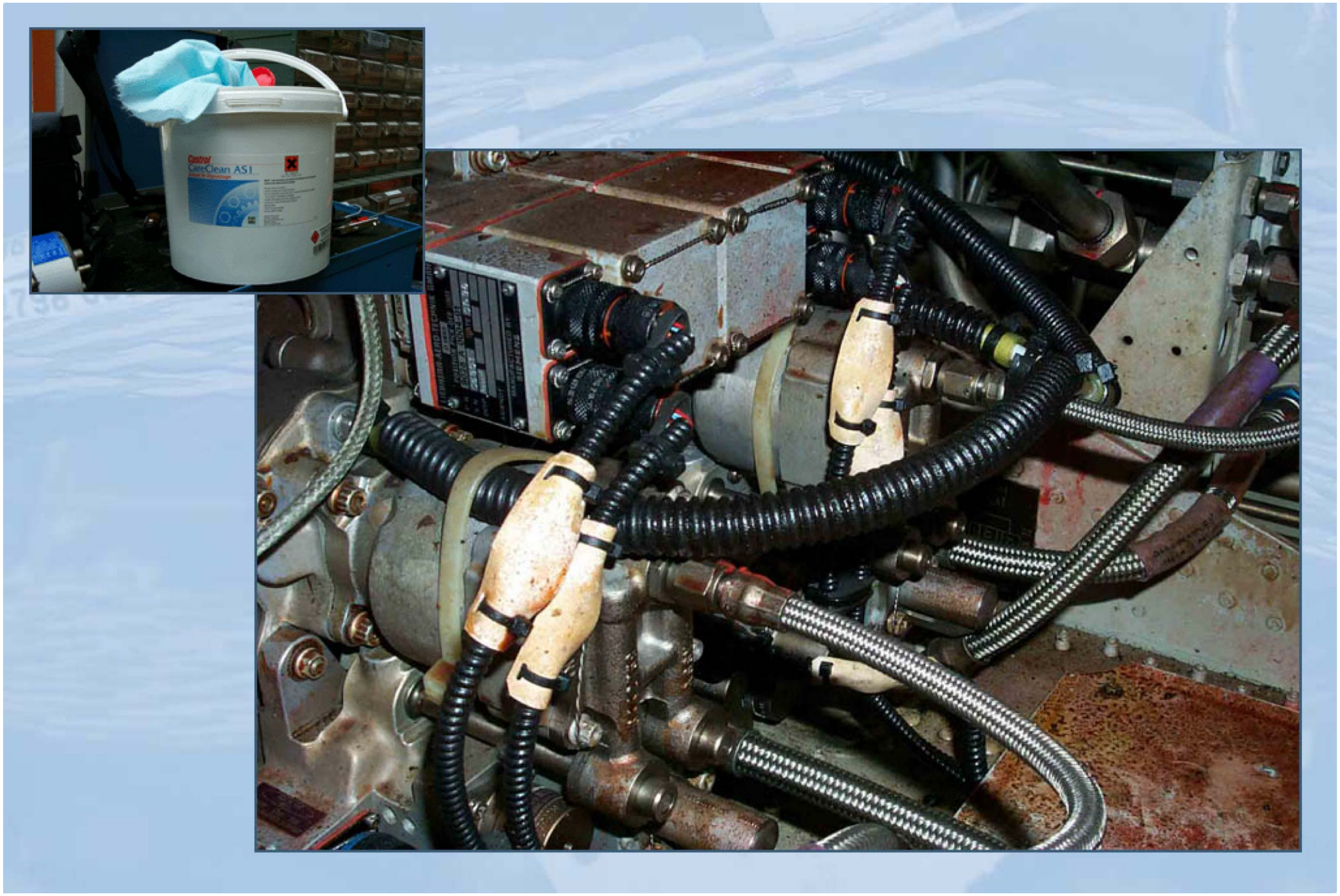
CLEANING OF CONDUITS

Cleaning of conduits.
Clean the conduit with a vacuum cleaner or a cloth.
To complete the cleaning, use a wet cloth moist with a solvent.
Check presence of contamination inside conduit.
To prevent new contamination:
- Move the conduit on the harness to have one end at the lowest point.
- Make a drain hole at the lowest parts.

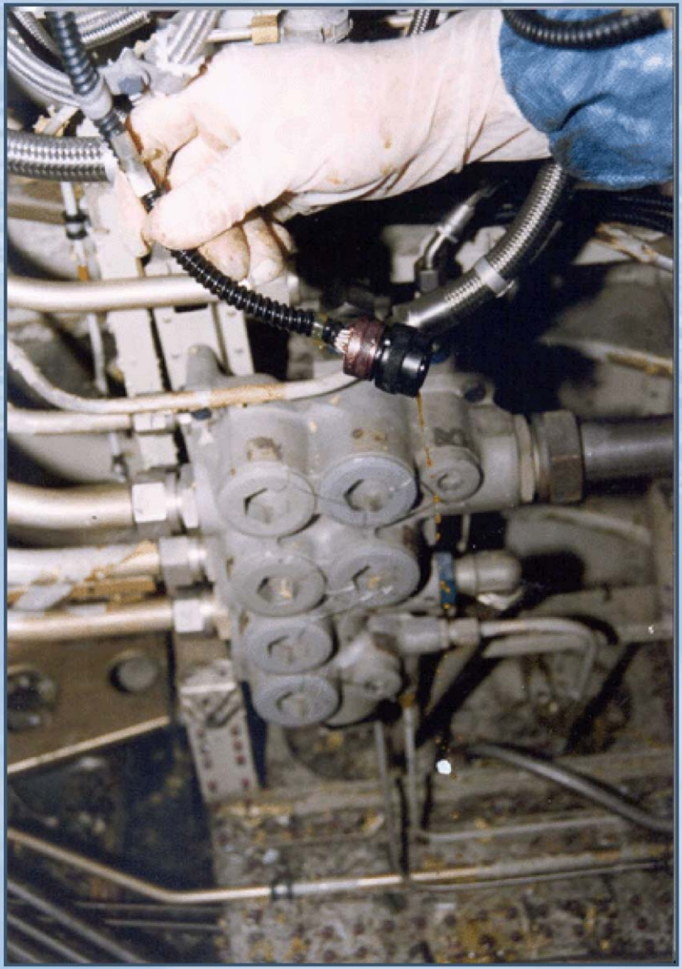
Use tool superflexit n°27672 to make drain hole.
Check existing drain hole.



CLEANING OF CONDUITS



CLEANING OF CONDUITS



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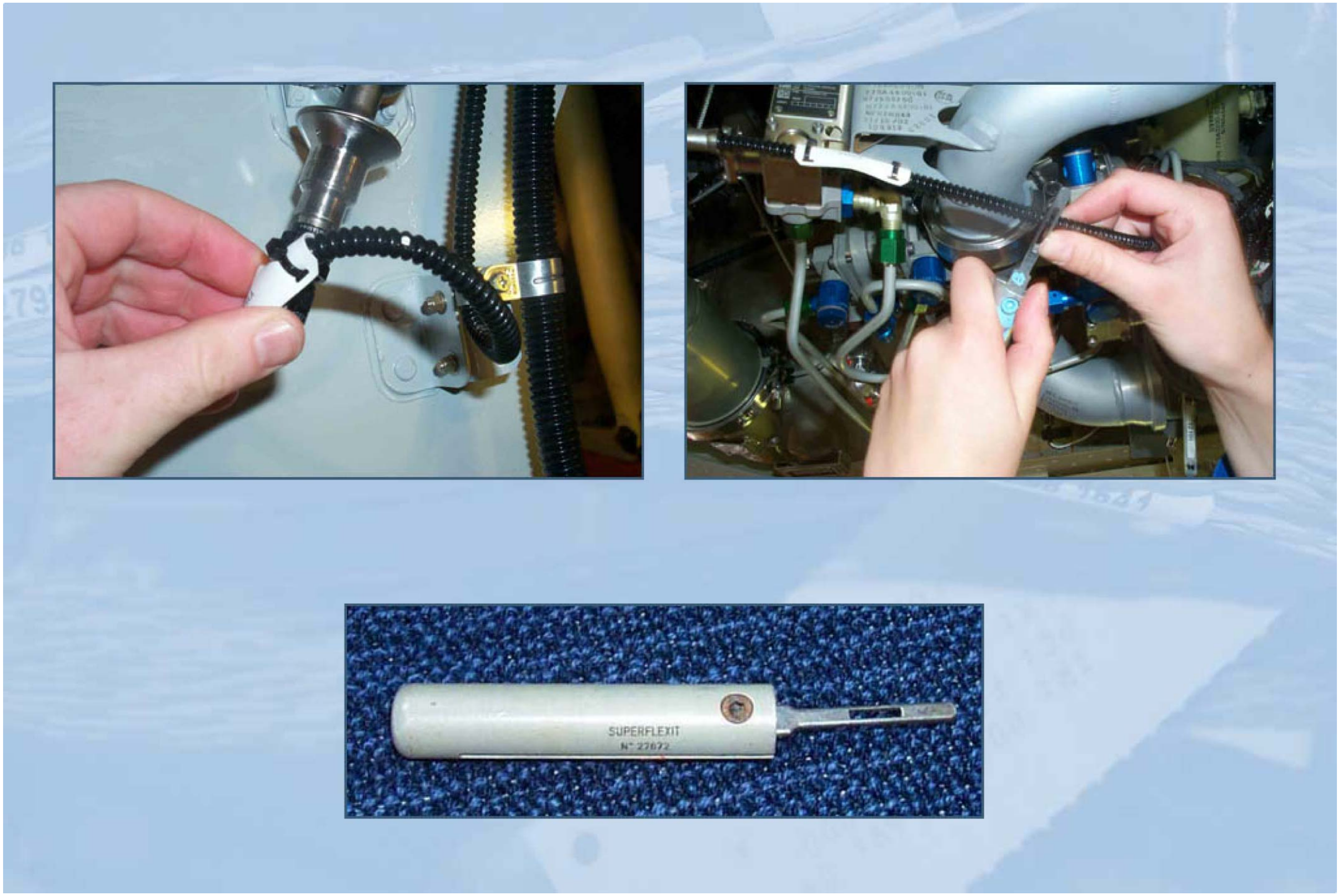

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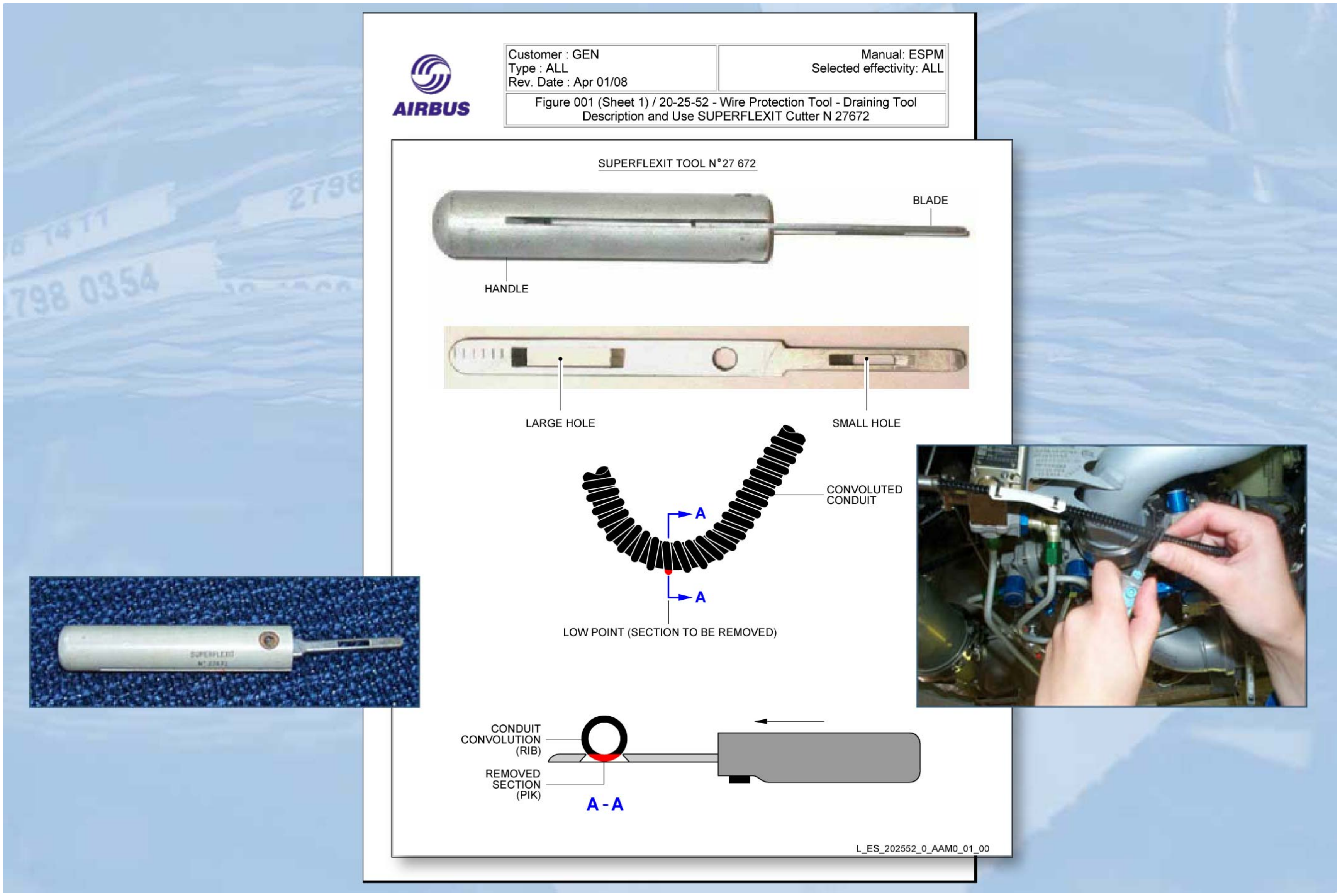

CLEANING OF CONDUITS

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20-55-30 - CLEANING OF CONDUITS (Airbus)	

CLEANING OF CONDUITS (Airbus)

CLEANING OF CONDUITS - DESCRIPTION AND OPERATION

1. General
   This chapter gives the instructions related to the cleaning of the flexible conduits and the fabric sheaths.
   The CML codes of the cleaning agents are given in 20-55-10.
2. Flexible Conduits, Shielded Flexible Conduits
   A. External contamination
      Use a Vacuum cleaner or a cloth to remove the contamination.
      If necessary, complete the cleaning operation with a cloth made moist with solvent then let dry.
   B. Internal contamination
      Make sure that the contamination agent is fully removed, specially in the low points of the conduit.
      (1) If there is a drain hole:
         - Put it at the lowest point and make sure that it is not blocked.
      (2) If there is no drain:
         - Move the conduit on the harness to have one end at the lowest point, or
         - Make a drain hole at the lowest point, or
         - Remove the conduit so that the contamination agent can flow out, clean the bundle and install a new conduit.
3. Fabric Sheaths
   The Polyamid Aromatic (NOMEX) sheath can operate as a wick. Make sure that the drying operation is correct.

WARNING: BE CAREFUL NOT TO CUT YOUR FINGERS. FLAKE OF NICKEL ARE SHARP.

4. Metallic conduits cleaning
   - Use cleaning agents (Material No. 11-004) and a lint-free cloth to remove any contamination fr fitting.
   - Remove any flakes or blisters, make sure that you do not damage the base metal while you do task.

   NOTE: A dental or a seal tools are recommended for the removal of flakes and blisters.

   NOTE: Following each cleaning, replacement, dismantalling or reconnection, a corrosion protection metallic end fittings and backshell of the braided conduits and overbraided harnesses must b applied .

   NOTE: The TCP (Temporary Corrosion Protection, also called TPS (Temporary Protection System)) be applied after connection and after the bonding check completed.

   NOTE: Do not apply the TPS to the conduit braid, non metallic sheath or to the electrical connectors can cause damage.

   - Use a brush or an airless spray to apply a continuous coat of storage preservation (Material No 008) with a thickness of 0.030 mm (0.0011 in.) to cover all the fitting.

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CLEANING OF CONDUITS

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CLEANING PROCESSES

CLEANING OF STANDARD ELEC ITEMS

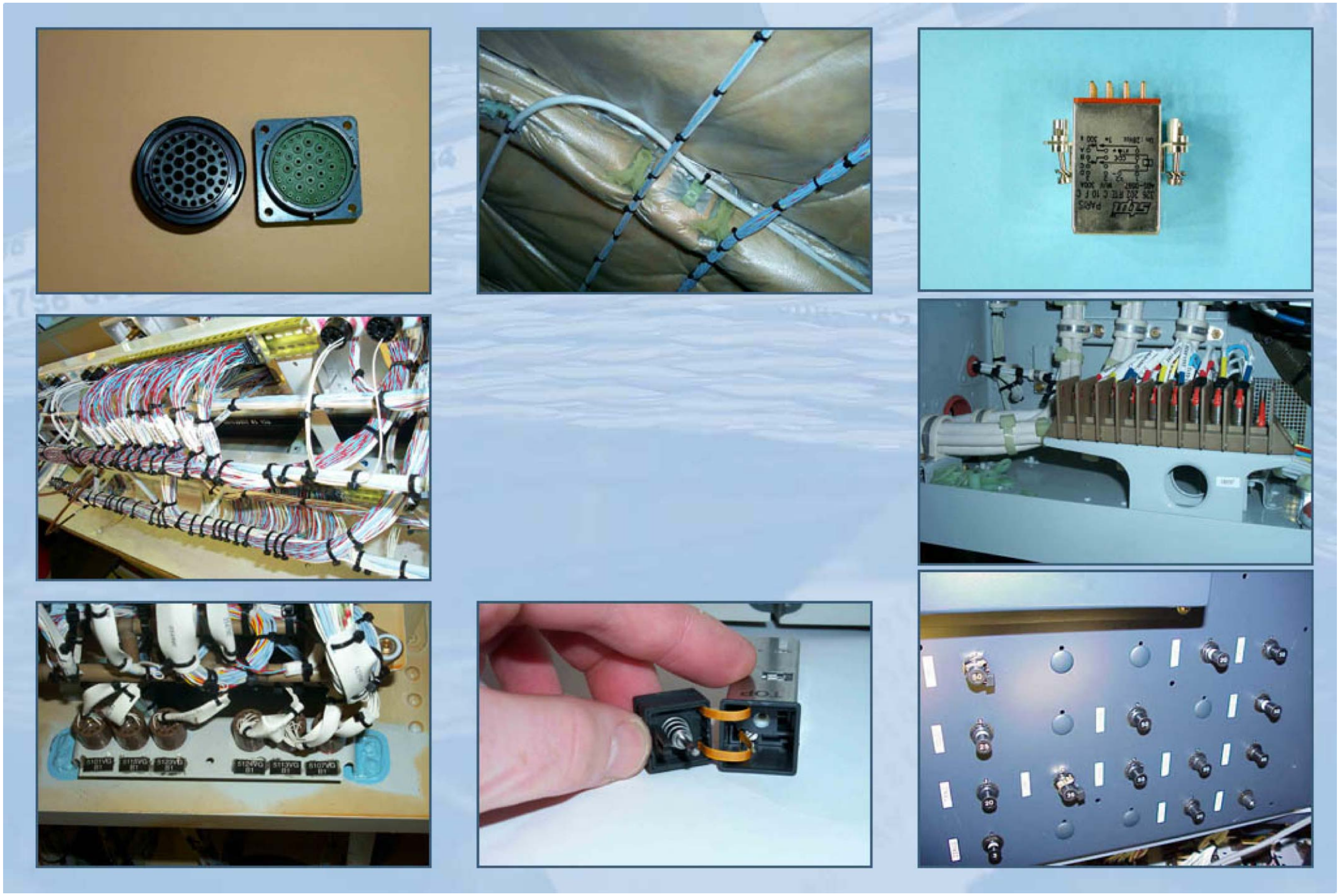
Cleaning of:
- Connectors
- Terminal block modules
- Grounding modules
- Pushbutton switches, lights
- Circuit breakers
- Terminals
- Relays and relay bases
- Bundle attachment

Sealed connectors, terminal block modules, grounding modules:
- Do not move the wire in the cavities.
- Do not disconnect the item.
- Clean by applying the solvent as a spray.

Check after the first cleaning by disconnecting (for example a connector) to ensure there is no contamination on the contacts.
When there is contamination on the contacts, clean with a spray or equivalent by holding the connector in a down position to permit the evacuation of the cleaning agent.
For relay and relay bases:
- Do not disconnect.
- Apply the cleaning agent with a soft brush or apply a spray.
- Lets the cleaning agent operate.
- Dry with a clean cloth.

After surface cleaning, check presence of deeper contamination. If there is deep contamination:
- Clean with a spray or a cleaning agent applied with a soft brush.
- Let's operate and dry.
- Reconnect.

For pushbuttons switches, replace the item because contamination agent (liquid or dust, etc...) can cause incorrect operation due to the presence on these pushbuttons of movable contacts.
For the sealed switches, use a cloth moist with solvent or use a brush to clean the grommet. For non-sealed switches, replace systematically.
Concerning the circuit breakers, you must replace systematically because you cannot be sure the contamination agent (liquid) did not go inside it.
For terminal strips and ground points, do not release the connection because the protection initially applied makes the connections sealed and gives protection against deep contamination.
Use a vacuum cleaner to remove the contamination and clean with a solvent.
If necessary, put a new identification label.
For the cables supports or clamps, you must remove the contamination agent with a vacuum cleaner and/or with isopropyl alcohol. If the contamination agent has caused deformation/damage to the support or clamp protection, you must replace the item.



CLEANING OF STANDARD ELEC ITEMS

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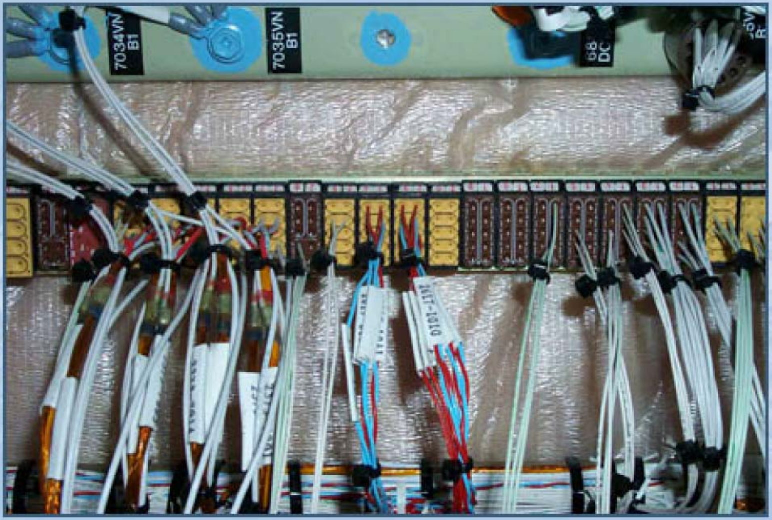

CLEANING OF STANDARD ELEC ITEMS

CLEANING OF STANDARD ELEC ITEMS

CLEANING OF STANDARD ELEC ITEMS

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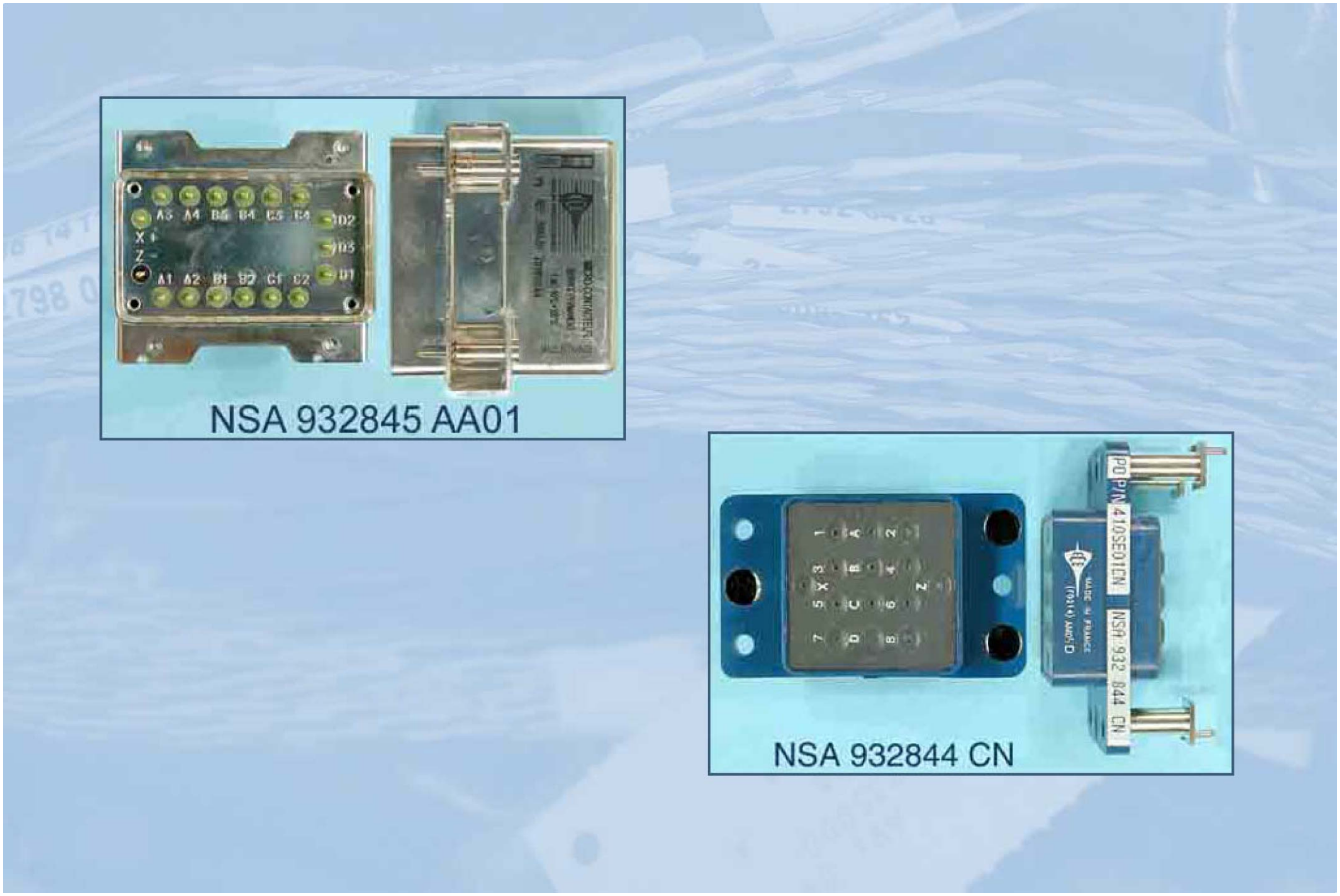

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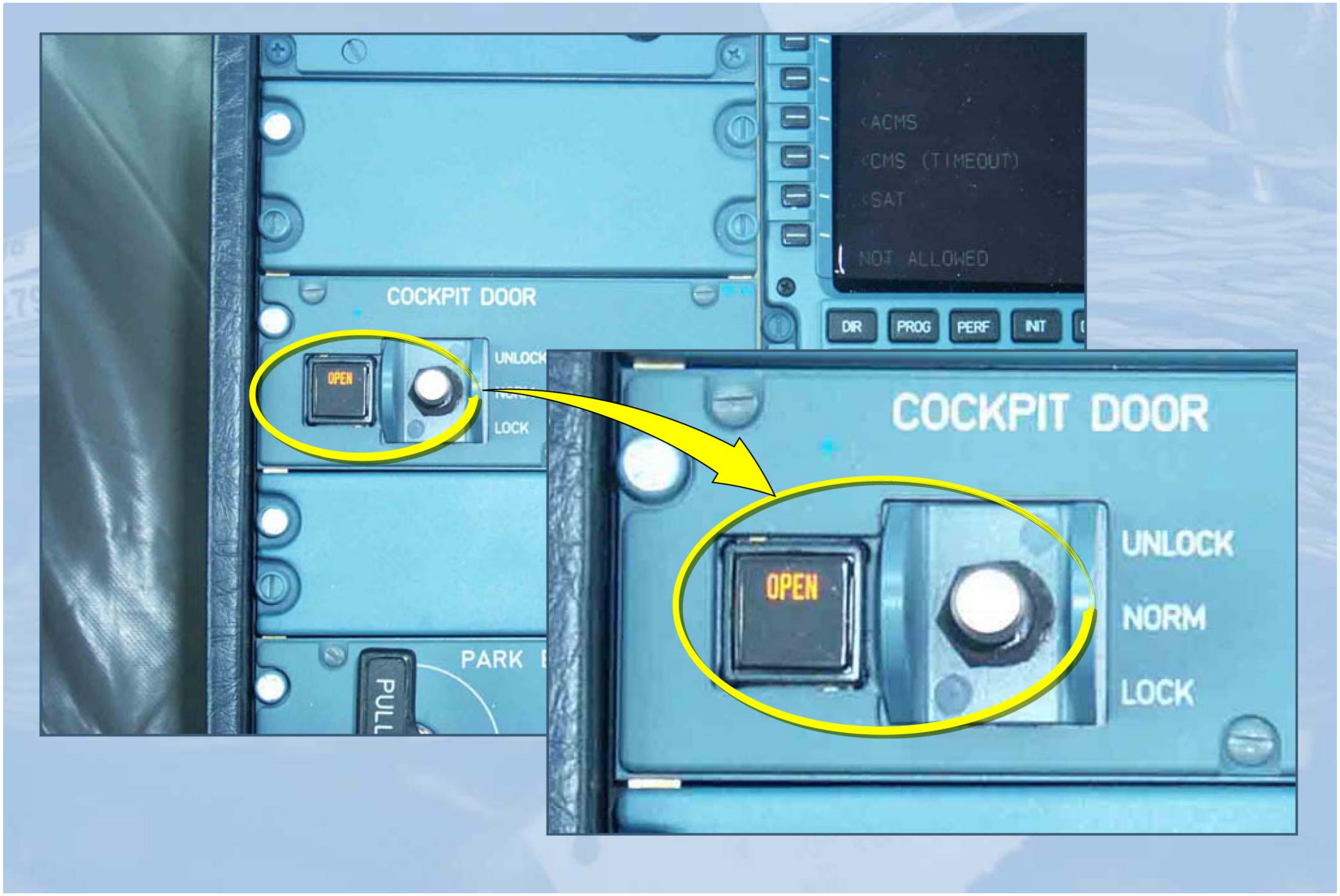

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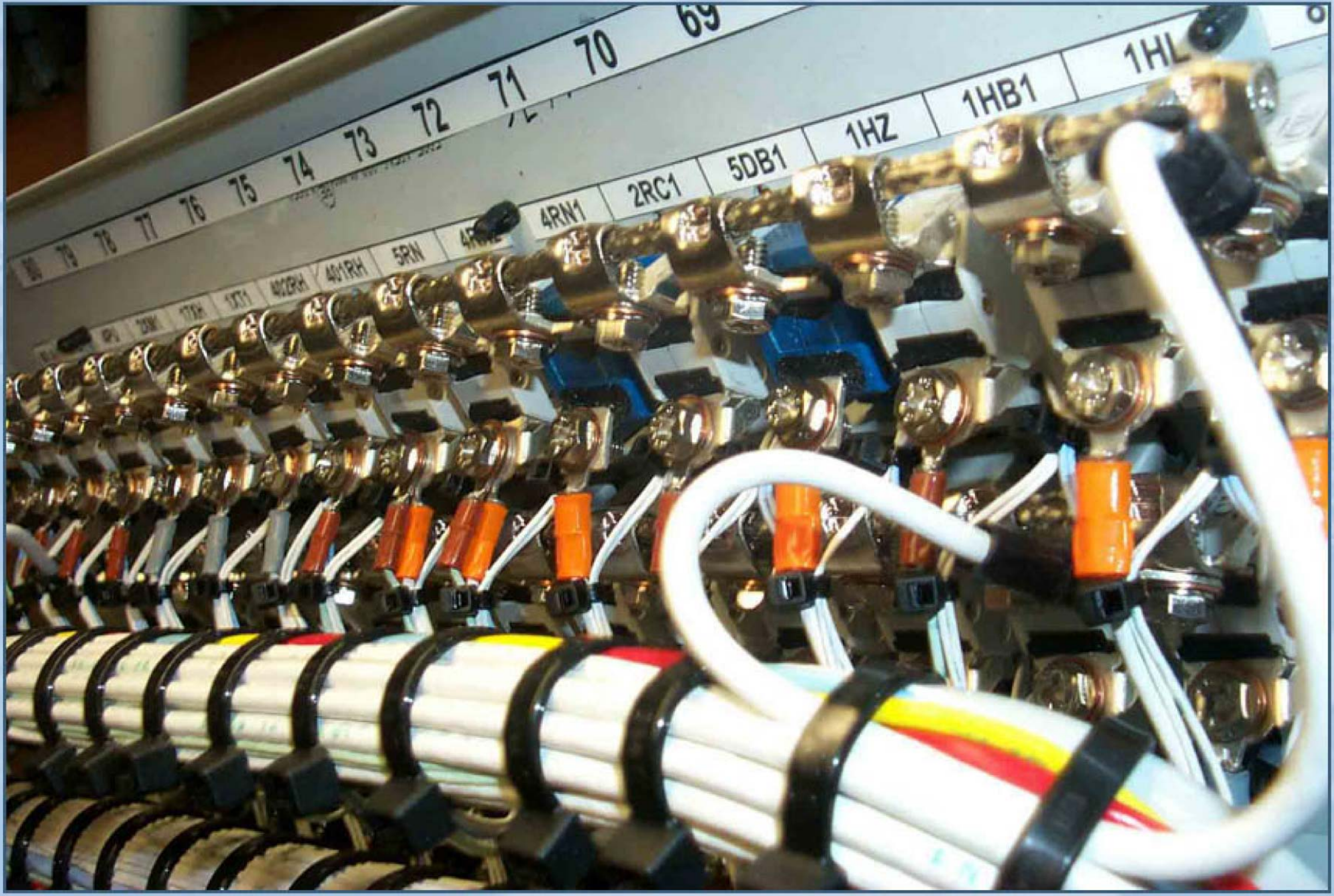

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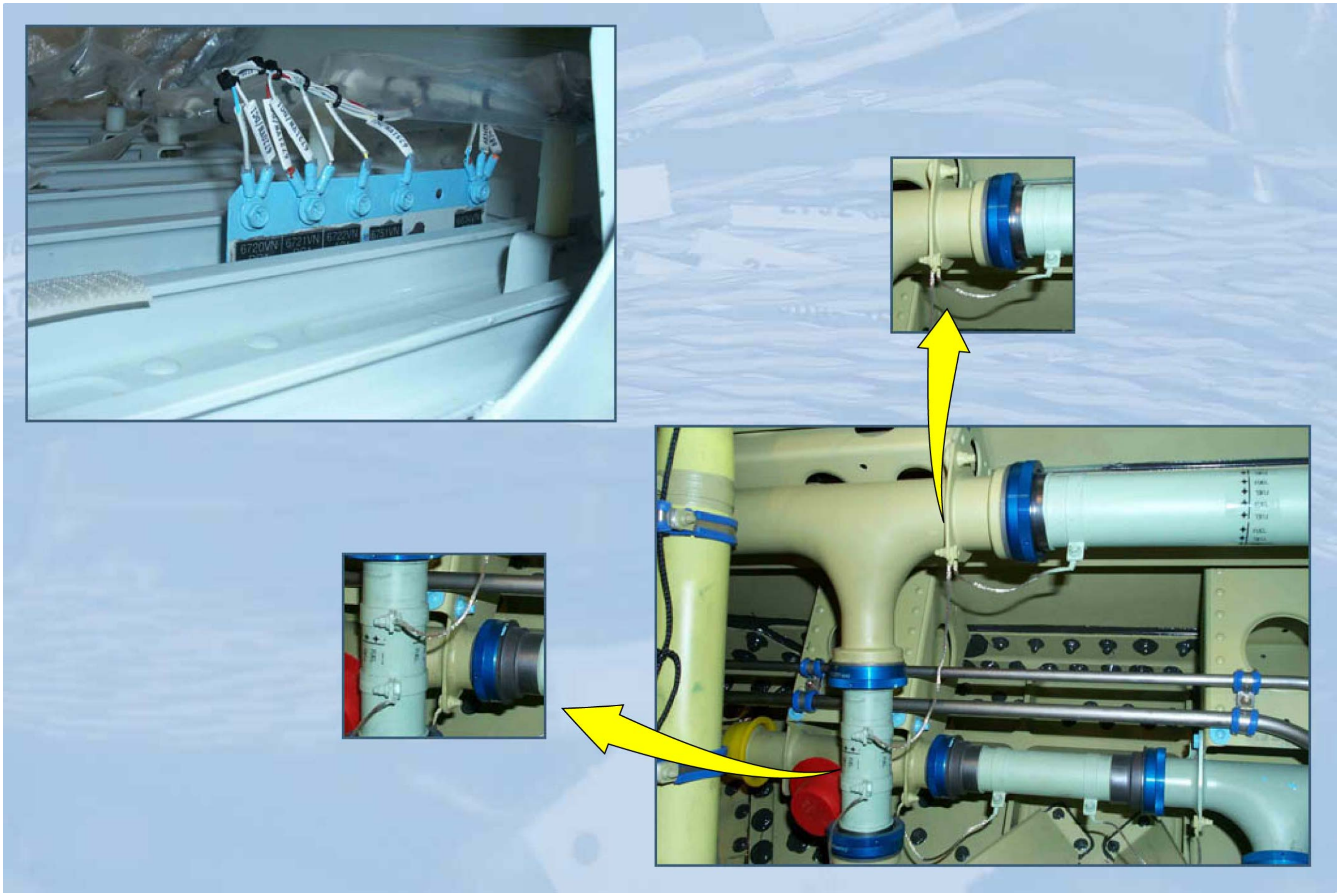

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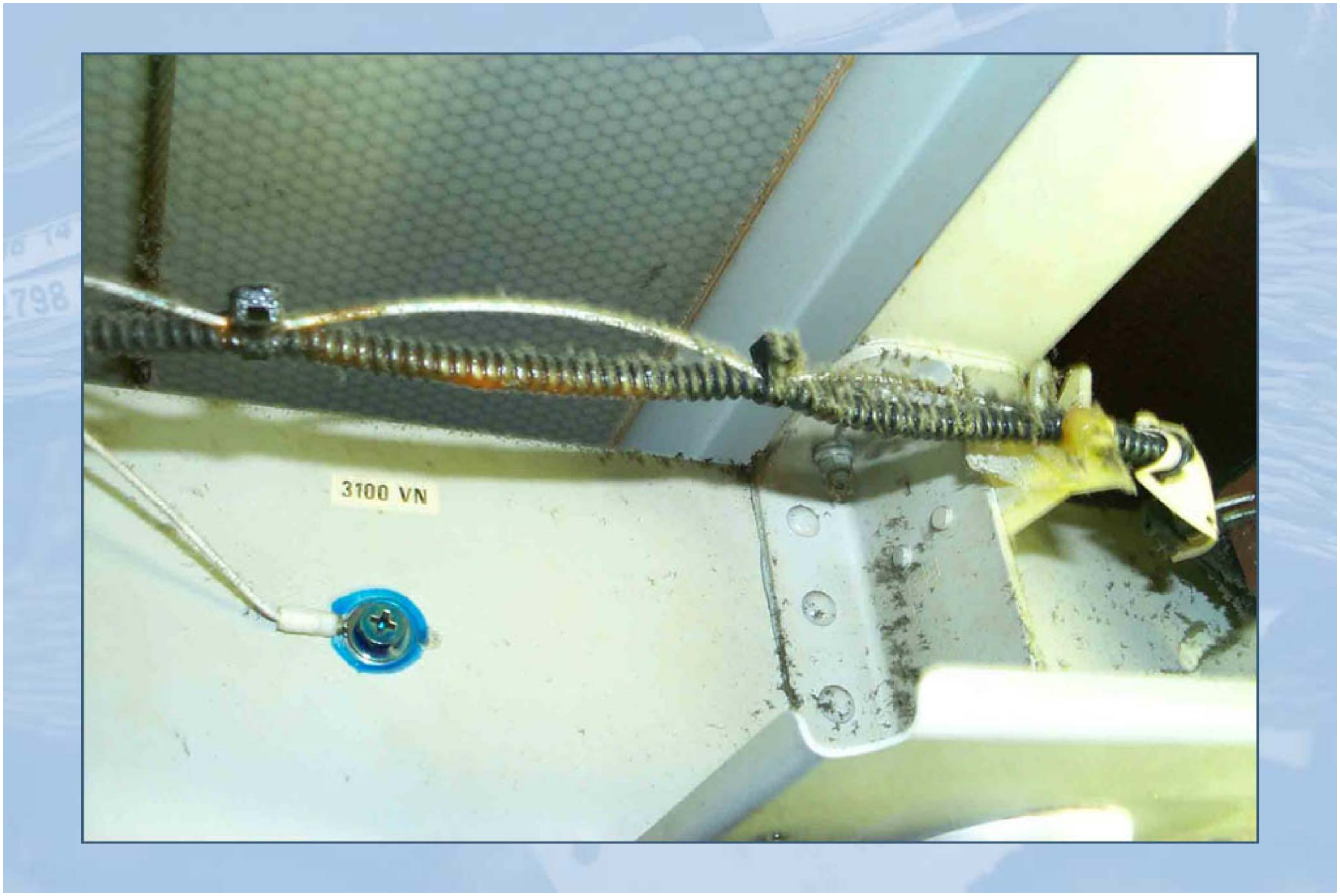
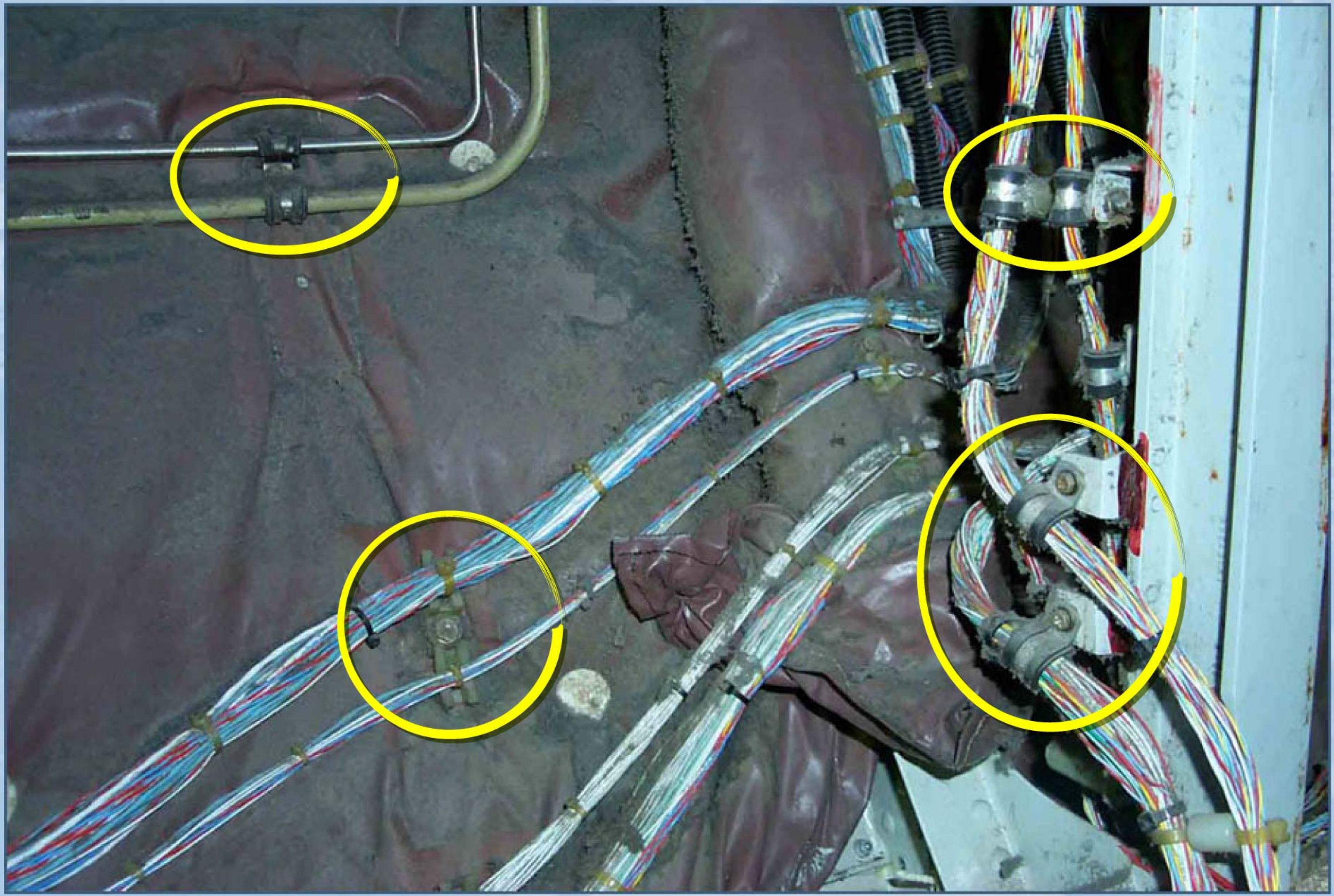


CLEANING OF STANDARD ELEC ITEMS



CLEANING OF STANDARD ELEC ITEMS

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CLEANING PROCESSES

SUMMARY OF CLEANING PROCESS

This part is a summary of the cleaning processes.
Before cleaning operation, obey to your local regulation concerning product/material you will use and to the documentation safety practices.
First: Protect yourself.
Second: Protect the aircraft.
As a general rule, you must check, depending on the area to clean and to work, if there is a special recommendation to follow.
For example, if you have to work in a fuel area, the rules to follow are not the same than in the cabin.
Before cleaning:
- Identify the source and type of contamination.
- Stop or contain source of contamination.

After this operation, clean the area. Do not hesitate to clean first a small area to test the efficiency of the cleaning product.
And after your cleaning operation, check the environment.
Check the drain holes of the aircraft as necessary.
After your cleaning operation fully performed, check you don't forget a tool used and if there is no unwanted object in the area.
And finally, it is recommended to perform an annual cleaning operation to maintain a good level of electrical installation.

SUMMARY OF CLEANING PROCESS

NOTE: Some circuits breakers (A320 family only) have a red threaded bush (P/N A92529086000). This bush prevents reset of the circuit breaker in flight (the crew cannot pull it). If, for maintenance safety reasons, it is necessary to open such a circuit breaker, you can remove the red threaded bush with a standard wrench.

**WARNING: BEFORE YOU USE A MATERIAL REFERRED TO IN THIS PUBLICATION, YOU MUST KNOW ALL OF THE APPLICABLE PRECAUTIONS.
THESE PRECAUTIONS TELL YOU HOW TO:**
- **USE THE MATERIAL SAFELY,**
- **KEEP THE MATERIAL SAFELY,**

READ THE SAFETY DATA SHEETS FROM THE MANUFACTURER OR THE SUPPLIER OF THE MATERIAL TO LEARN THE RECOMMENDED PRECAUTIONS. OBEY YOUR LOCAL REGULATIONS.

**WARNING: USE SOLVENTS/CLEANING AGENTS, SEALANTS AND OTHER SPECIAL MATERIALS ONLY WITH A GOOD FLOW OF AIR THROUGH THE WORK AREA.
THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND SKIN IRRITANTS.
OBEY THE MANUFACTURERS INSTRUCTIONS.
PUT ON PROTECTIVE CLOTHING.
DO NOT GET THEM IN YOUR MOUTH.
DO NOT SMOKE.
DO NOT BREATHE THE GAS.
GET MEDICAL HELP IF YOUR SKIN OR EYES BECOME IRRITATED.**

B. Materials

WARNING: BE CAREFUL WHEN YOU USE ELECTRIC TOOLS ON THE AIRCRAFT BECAUSE THERE ARE RISKS OF ELECTROCUTION OR EXPLOSION. IF THERE ARE LOCAL REGULATIONS RELATED TO ELECTRIC TOOLS, MAKE SURE THAT YOU OBEY THEM.

WARNING: BE CAREFUL WHEN YOU USE ELECTRIC TOOLS IN AREAS WHERE THERE ARE RISKS OF EXPLOSION (FUEL TANKS, FUEL VAPOUR AREAS, ETC.). REFER TO YOUR LOCAL REGULATIONS AND MAKE SURE THAT YOU OBEY THEM. SOME ELECTRIC TOOLS SUCH AS HEAT GUNS, SOLDERING IRONS AND TOOLS WITHOUT INTRINSIC PROTECTION ARE NOT PERMITTED IN THESE AREAS.

C. Tools
Never use electric tools which deliver an energy of more than 0.02 millijoule in fuel tanks or in areas where there are flammable vapors.
Never use heat-generating tools in the fuel tanks or in areas where there are flammable vapors.
Use only crimp-type contacts, terminals, splices, sleeves (non-heat shrinkable sleeves) in these areas.

D. Cables
For cables in harnesses that are identified by a P/N (engine, landing gear, fuel tanks, etc...), also refer to the applicable manufacturer documentation (CMM).

Figure 001.1 / Graphic SH 001.1 Safety Practices - Typical Tag

SUMMARY OF CLEANING PROCESS

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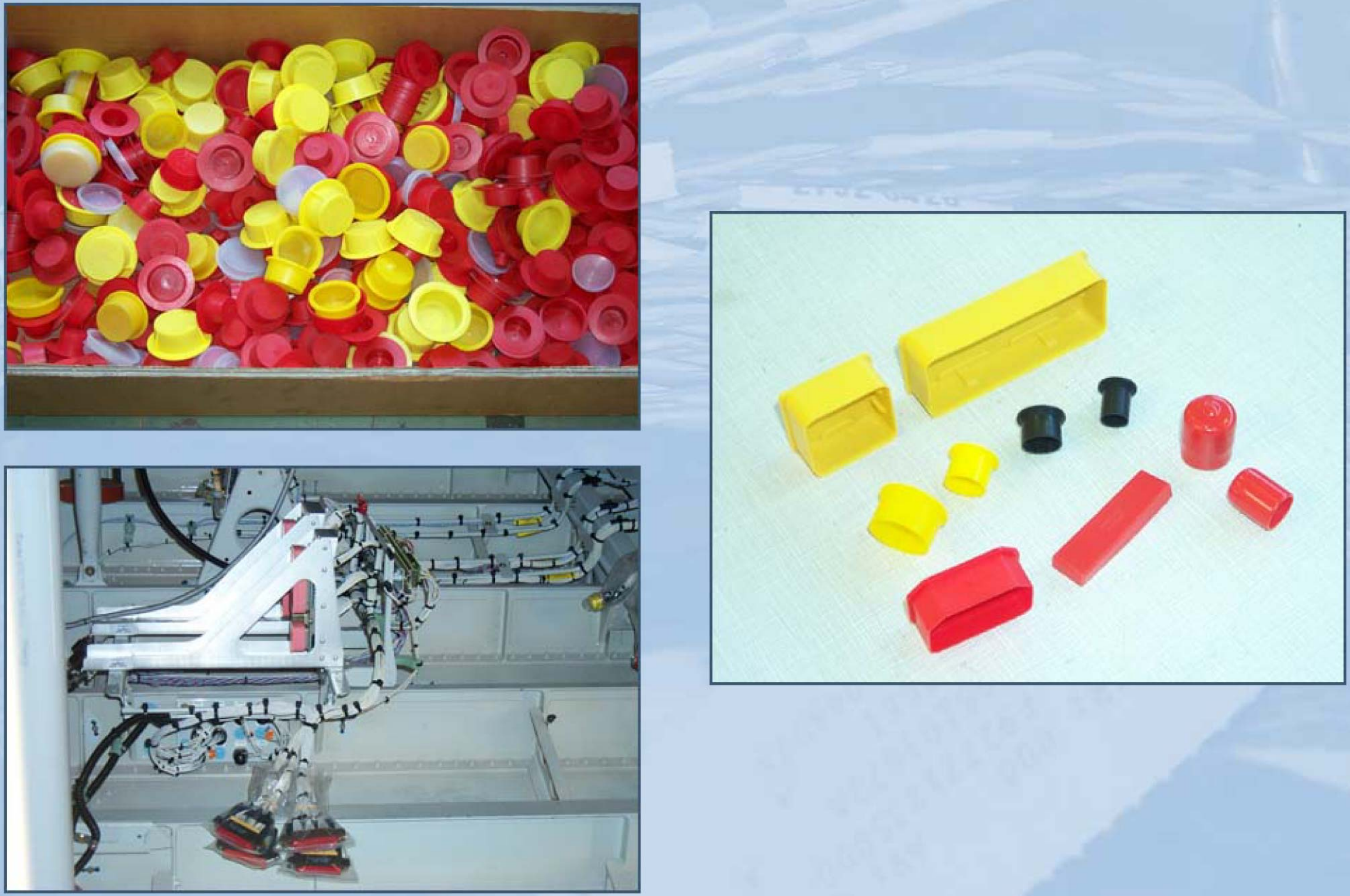
SUMMARY OF CLEANING PROCESS



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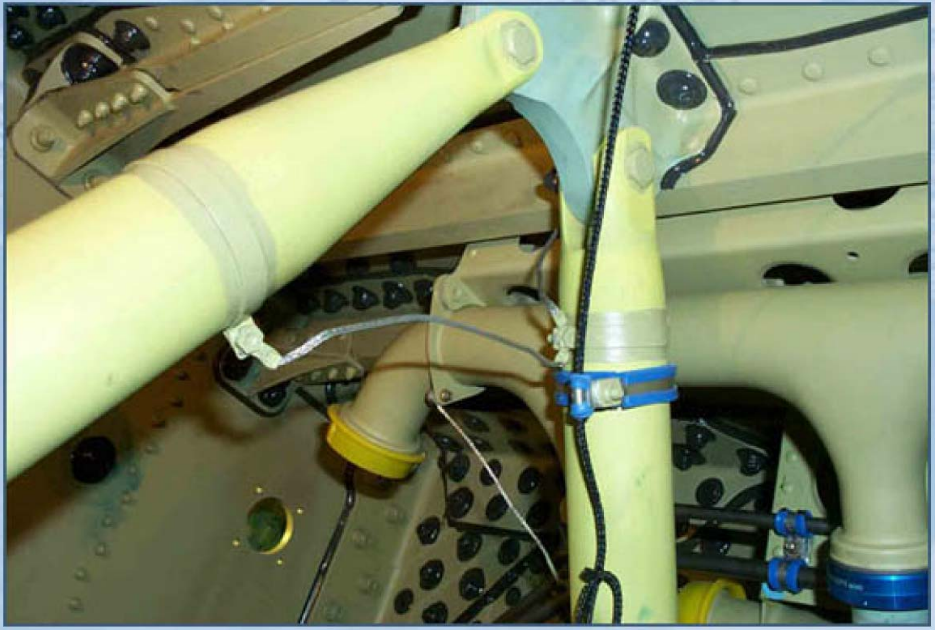

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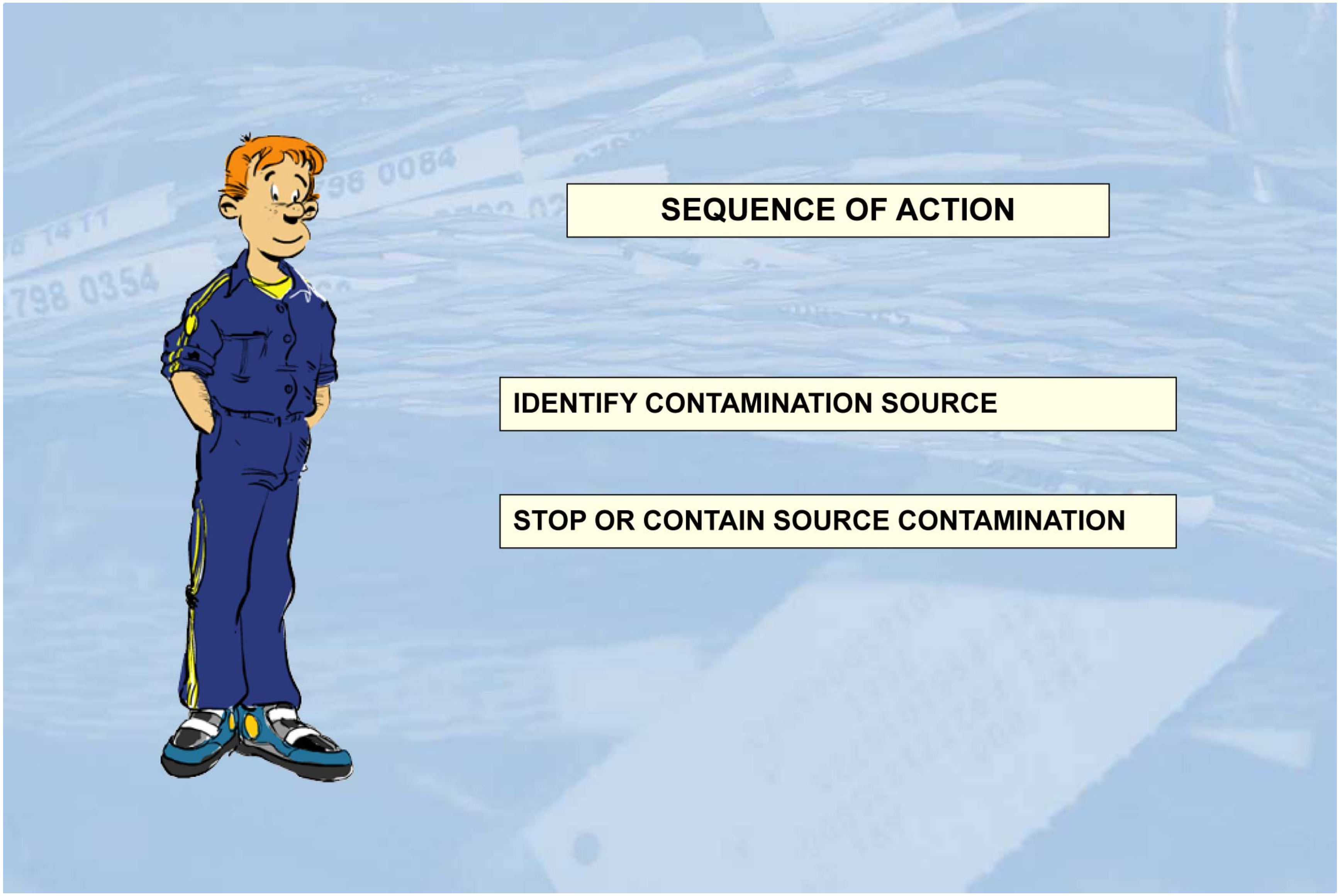

SUMMARY OF CLEANING PROCESS

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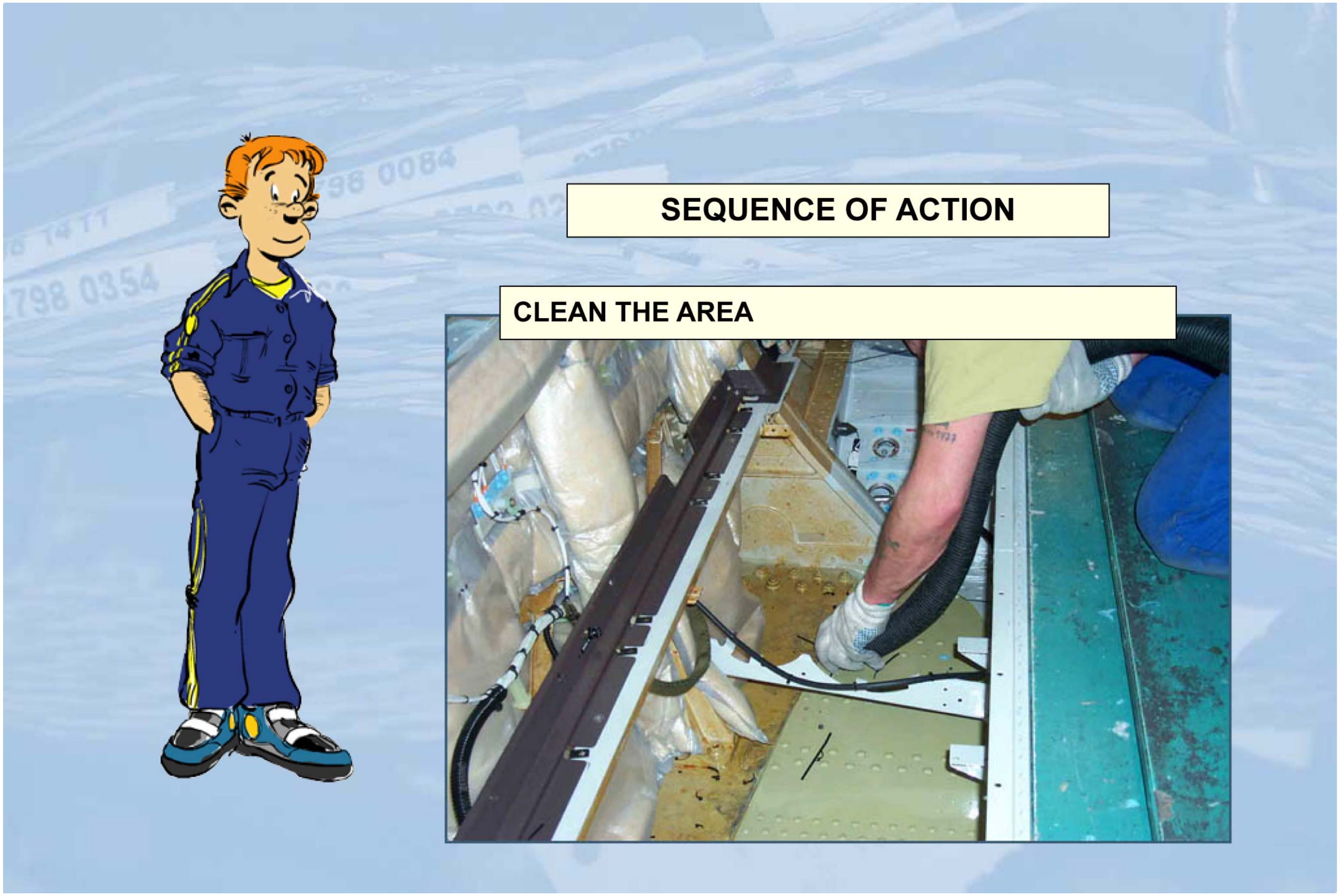

SUMMARY OF CLEANING PROCESS

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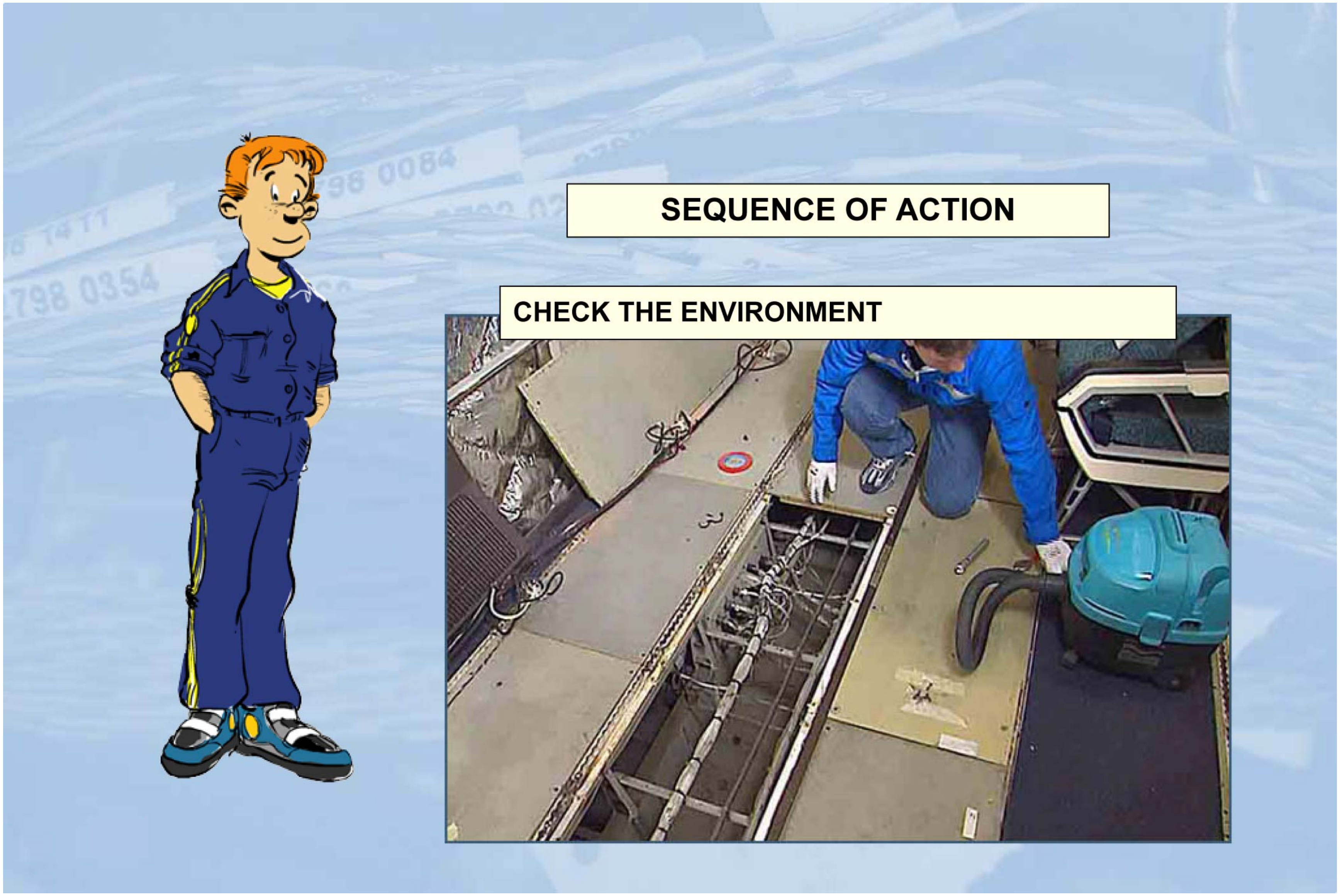

SUMMARY OF CLEANING PROCESS

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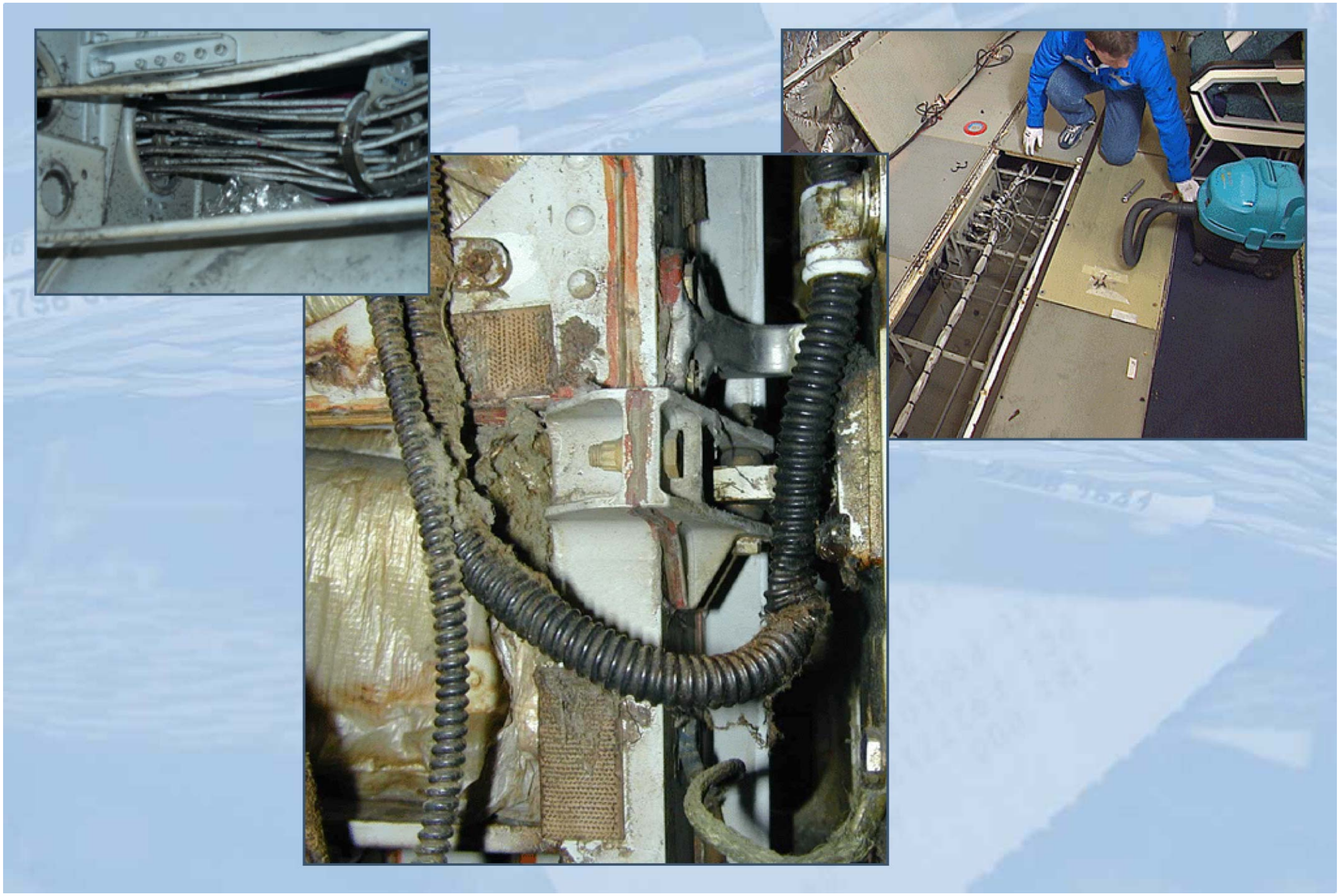
SUMMARY OF CLEANING PROCESS



SUMMARY OF CLEANING PROCESS

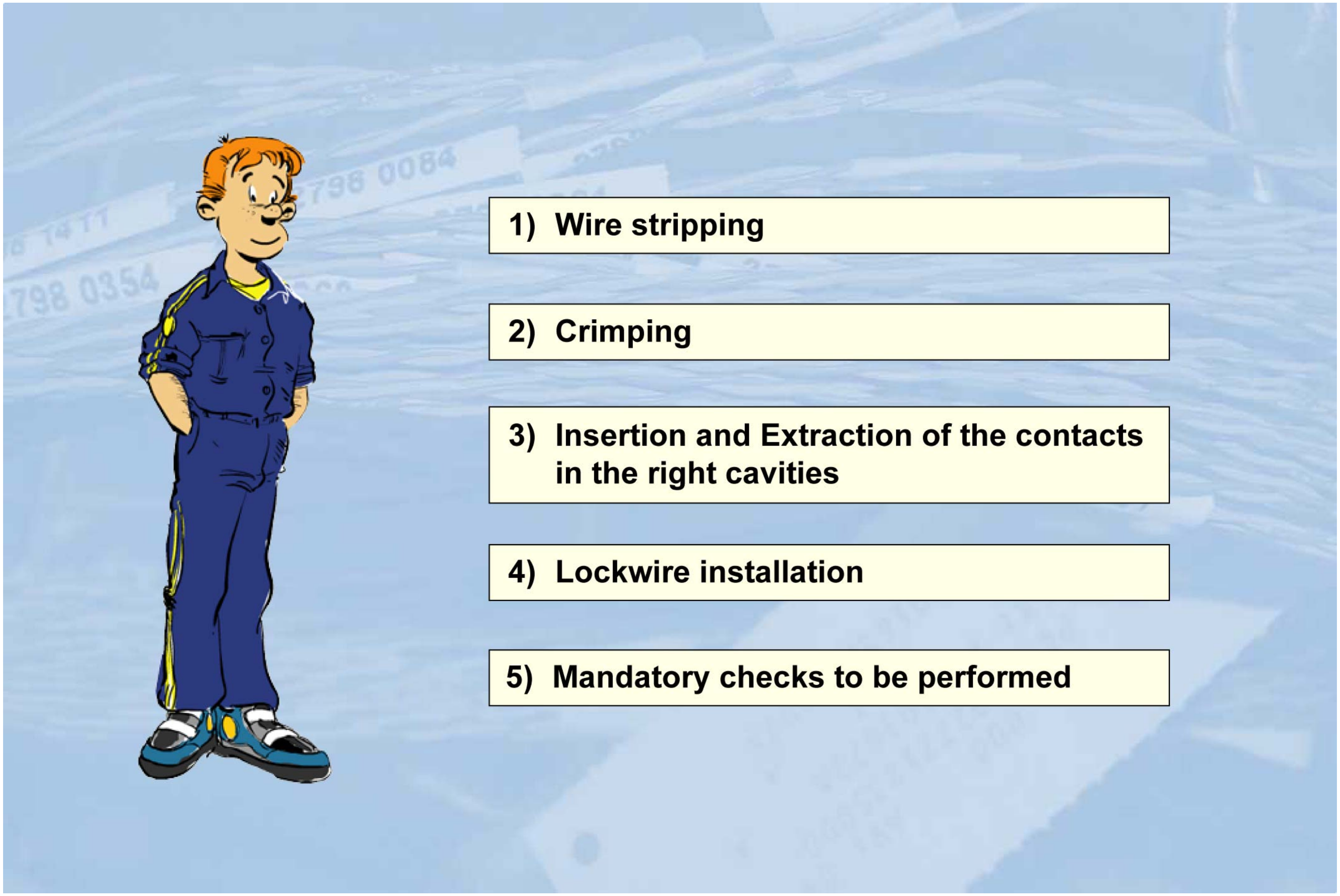
SUMMARY OF CLEANING PROCESS

X8U08481 - X0332T0 - XM2022000000001

CIRCULAR CONNECTORS

CIRCULAR CONNECTORS

1) Wire stripping
2) Crimping
3) Insertion and Extraction of the contacts in the right cavities
5) Lockwire installation
4) Mandatory checks to be performed
1) Wire stripping
2) Crimping
3) Insertion and Extraction of the contacts in the right cavities
4) Mandatory checks to be performed
5) Lockwire installation



CIRCULAR CONNECTORS

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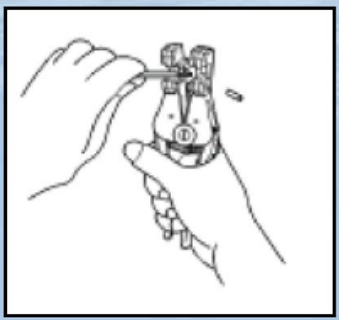
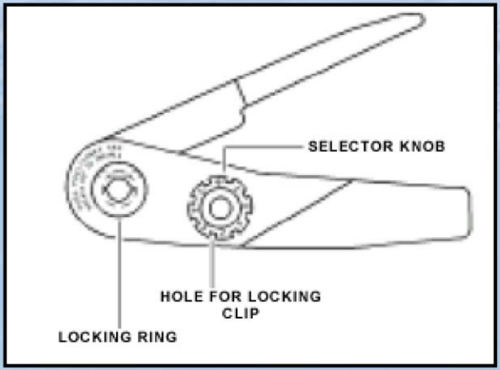
1) Wire stripping



CIRCULAR CONNECTORS

X8U08481 - X0332T0 - XM2040000000001

2) Crimping

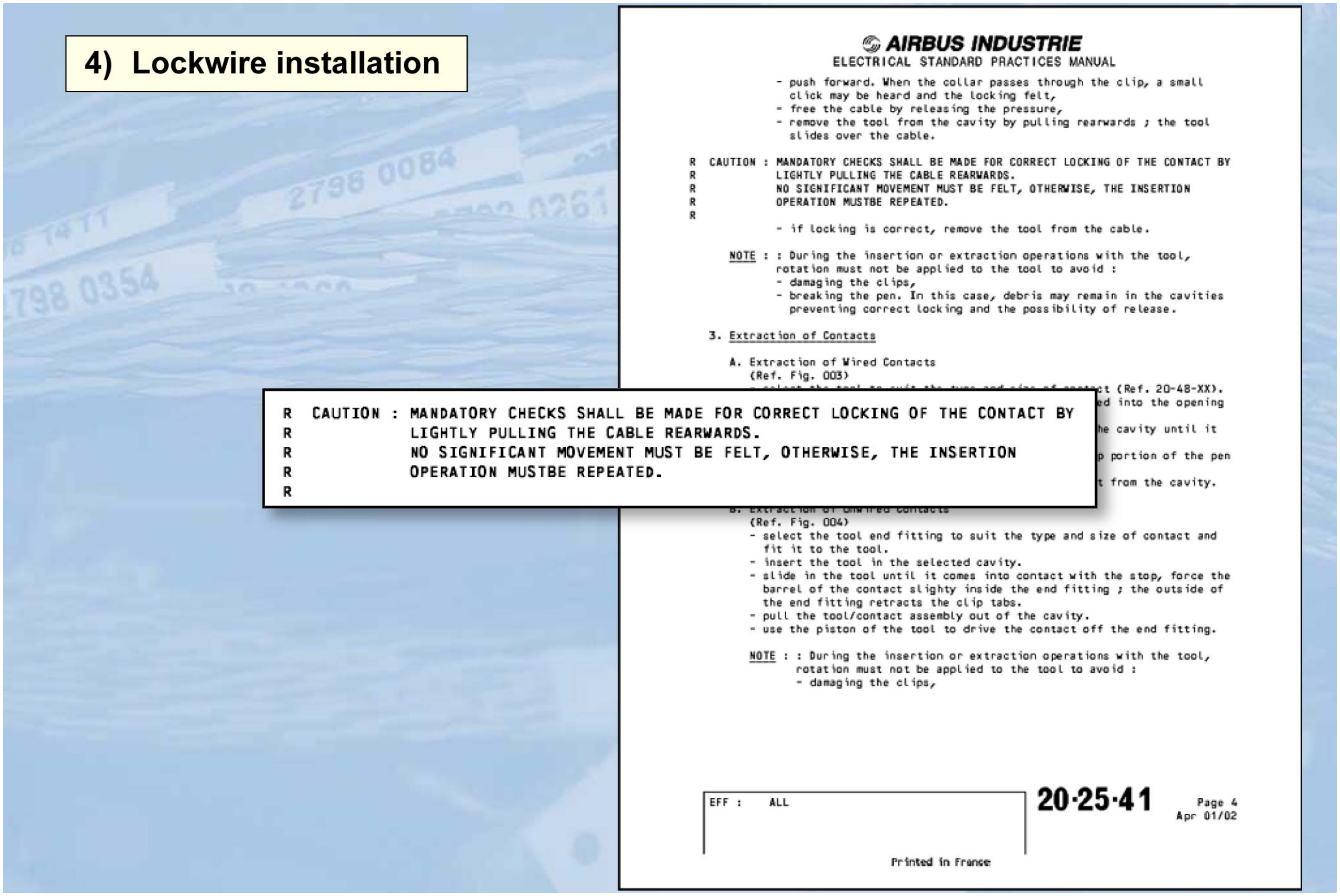


CIRCULAR CONNECTORS

3) Insertion and Extraction of the contacts in the right cavities

CIRCULAR CONNECTORS

4) Lockwire installation



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- push forward. When the collar passes through the clip, a small click may be heard and the locking felt,
- free the cable by releasing the pressure,
- remove the tool from the cavity by pulling rearwards ; the tool slides over the cable.

R CAUTION : MANDATORY CHECKS SHALL BE MADE FOR CORRECT LOCKING OF THE CONTACT BY
R LIGHTLY PULLING THE CABLE REARWARDS.
R NO SIGNIFICANT MOVEMENT MUST BE FELT, OTHERWISE, THE INSERTION
R OPERATION MUSTBE REPEATED.
R

- if locking is correct, remove the tool from the cable.

NOTE : : During the insertion or extraction operations with the tool, rotation must not be applied to the tool to avoid :
- damaging the clips,
- breaking the pen. In this case, debris may remain in the cavities preventing correct locking and the possibility of release.

3. Extraction of Contacts

A. Extraction of Wired Contacts
(Ref. Fig. 003)
...ct (Ref. 20-48-XX).
...ed into the opening
...he cavity until it
...p portion of the pen
...t from the cavity.

B. Extraction of Unwired Contacts
(Ref. Fig. 004)
- select the tool end fitting to suit the type and size of contact and fit it to the tool.
- insert the tool in the selected cavity.
- slide in the tool until it comes into contact with the stop, force the barrel of the contact slighty inside the end fitting ; the outside of the end fitting retracts the clip tabs.
- pull the tool/contact assembly out of the cavity.
- use the piston of the tool to drive the contact off the end fitting.

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R

CIRCULAR CONNECTORS

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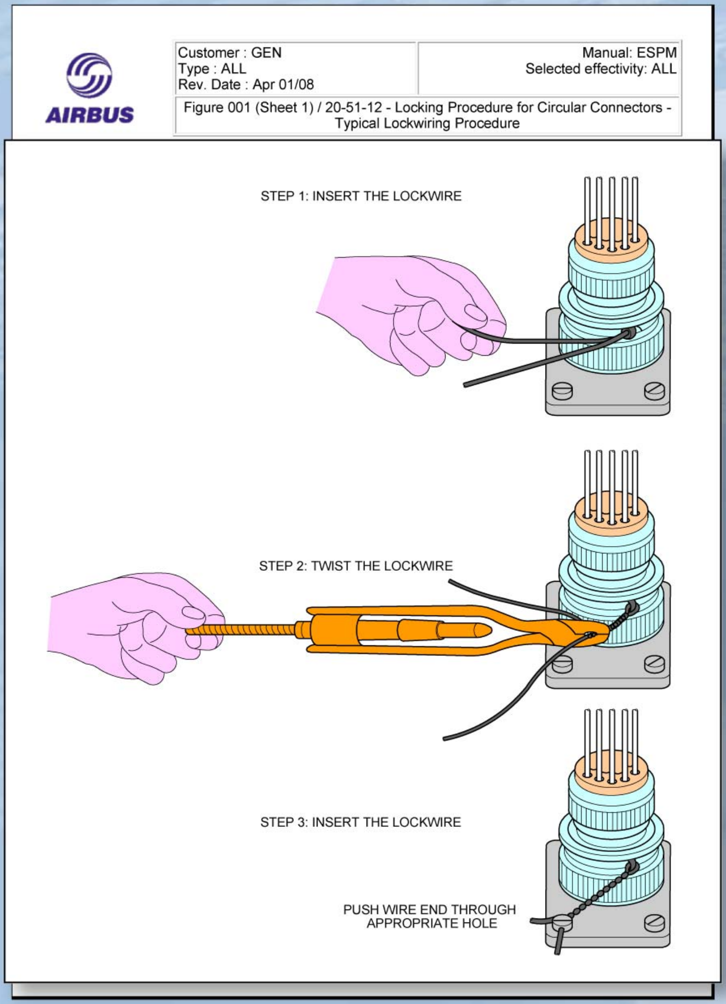
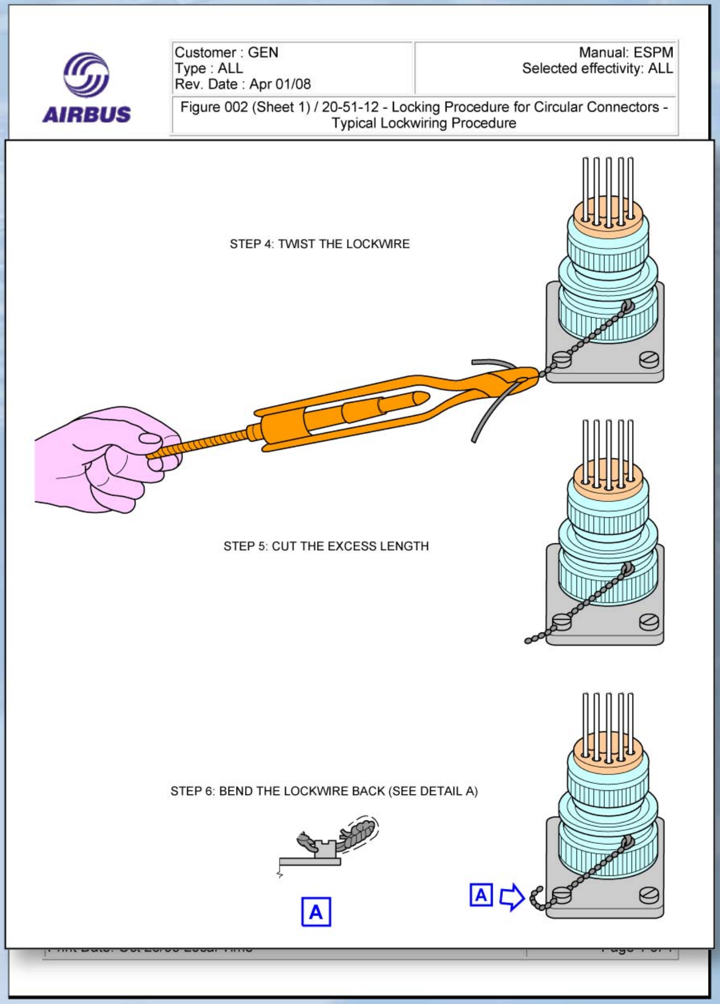
5) Mandatory checks to be performed





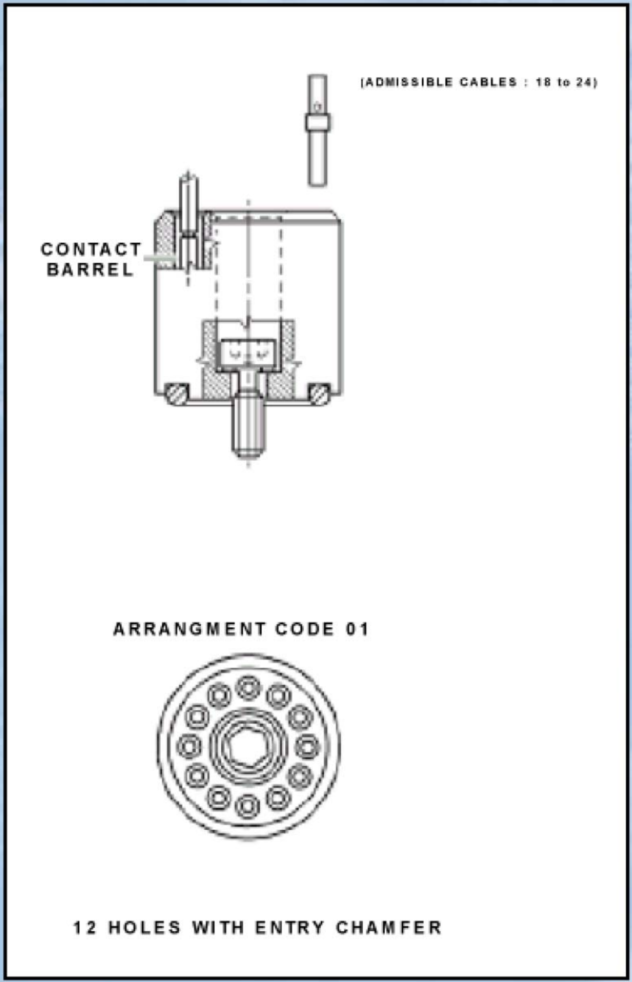
CIRCULAR CONNECTORS

CIRCULAR CONNECTORS

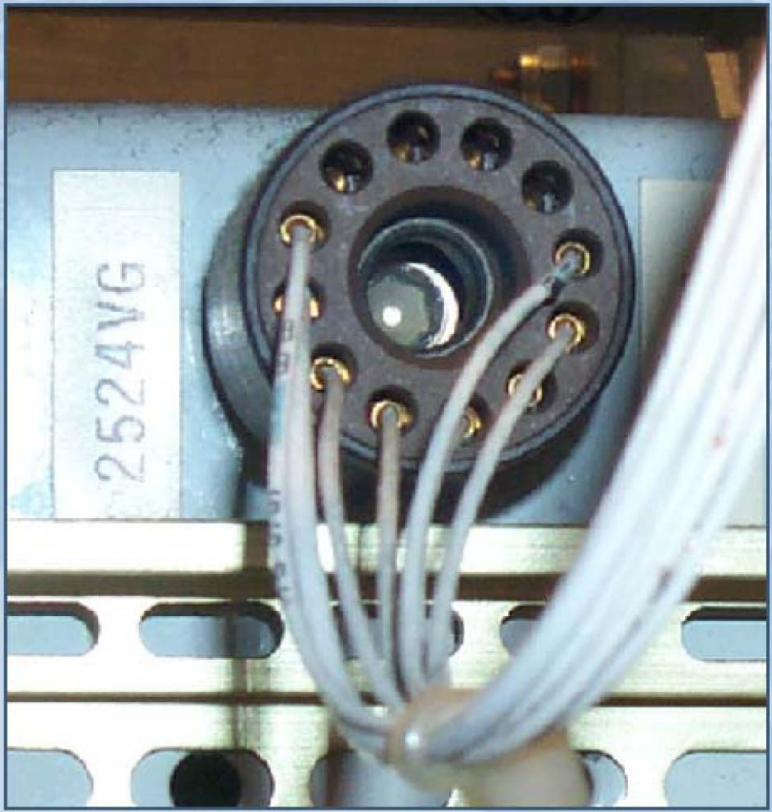
GROUNDING MODULES

GROUNDING MODULES

E0425
NSA 937915 and NSA 937916



E0425



GROUNDING MODULES

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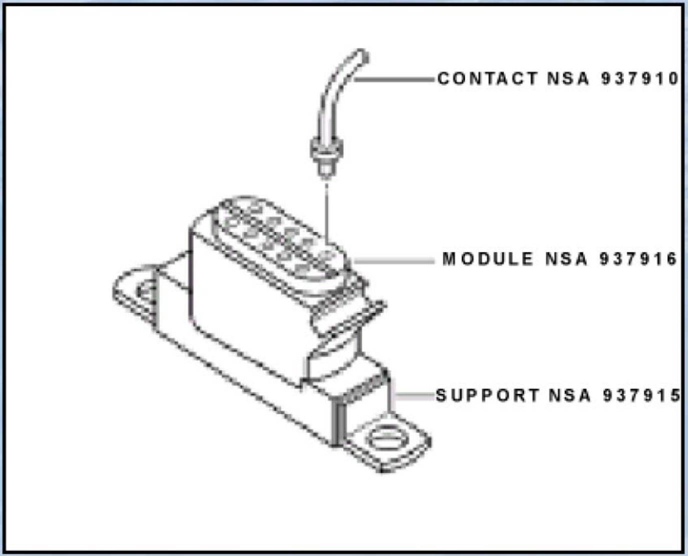
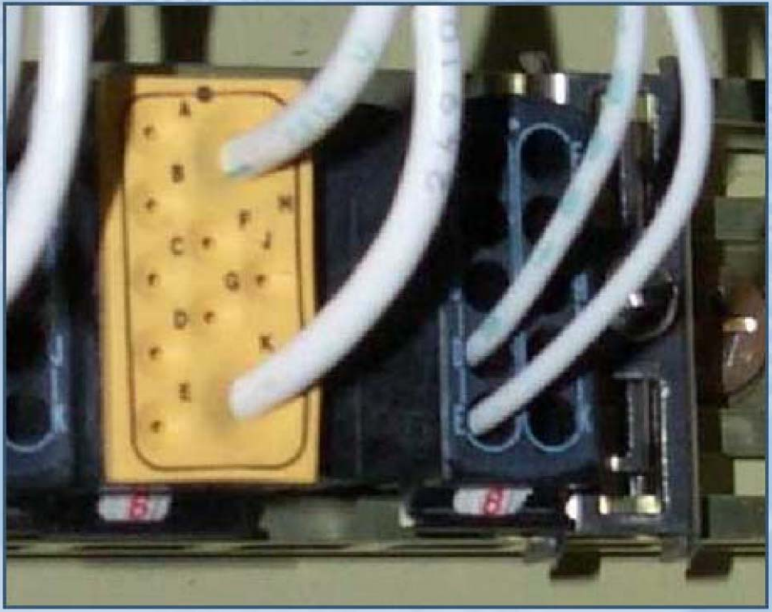
NSA 937915 and NSA 937916





GROUNDING MODULES

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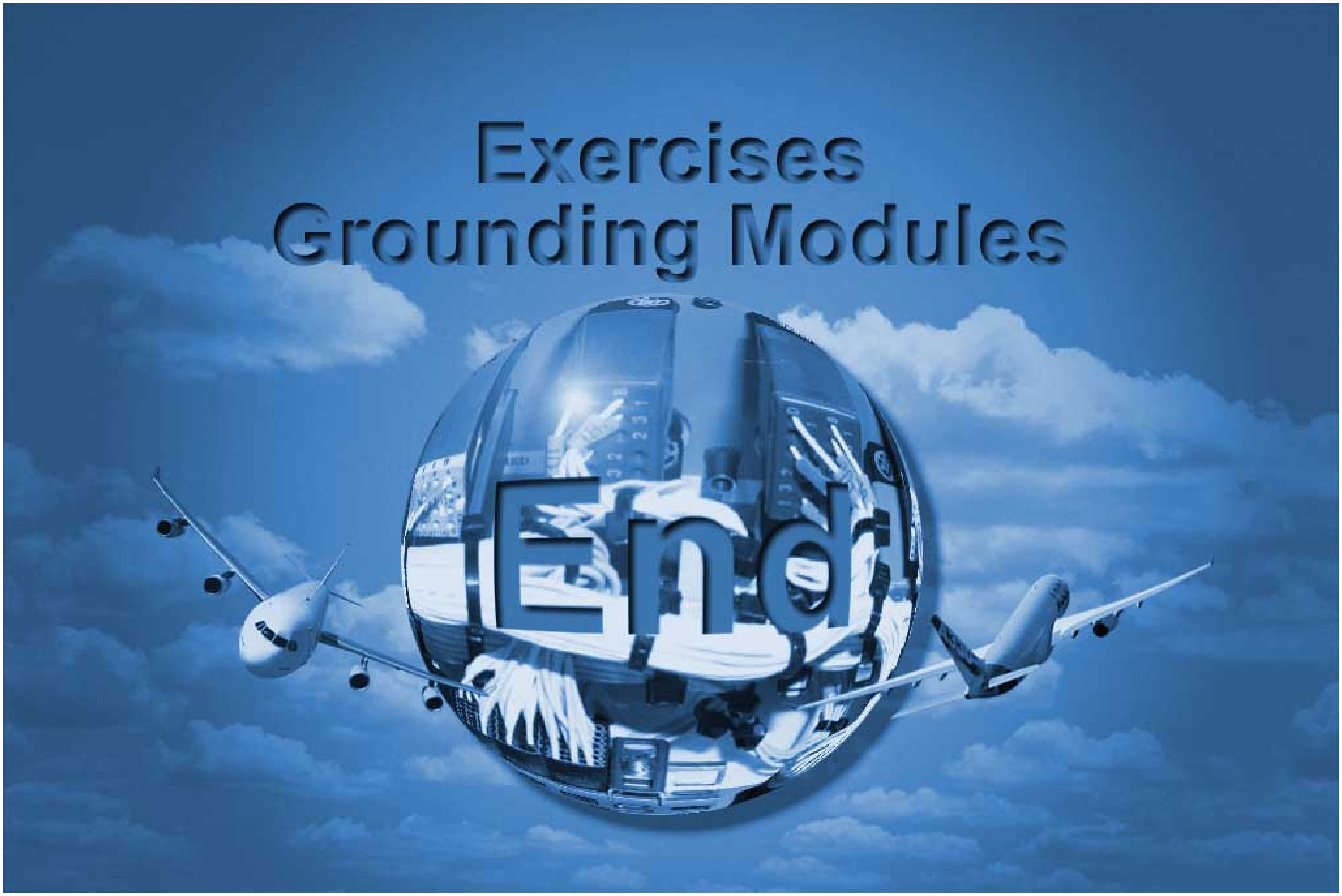


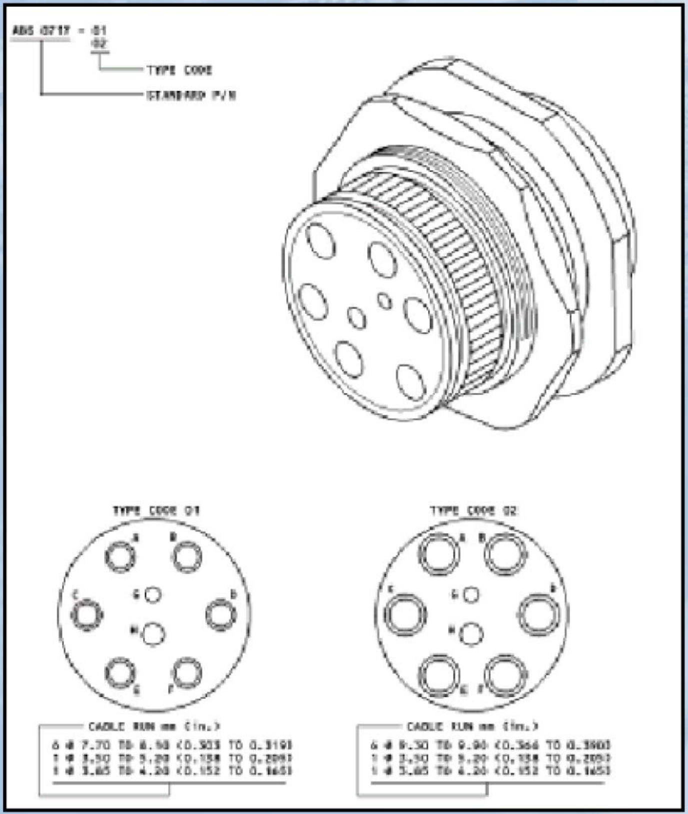
GROUNDING MODULES

PRESSURE SEALS

PRESSURE SEALS

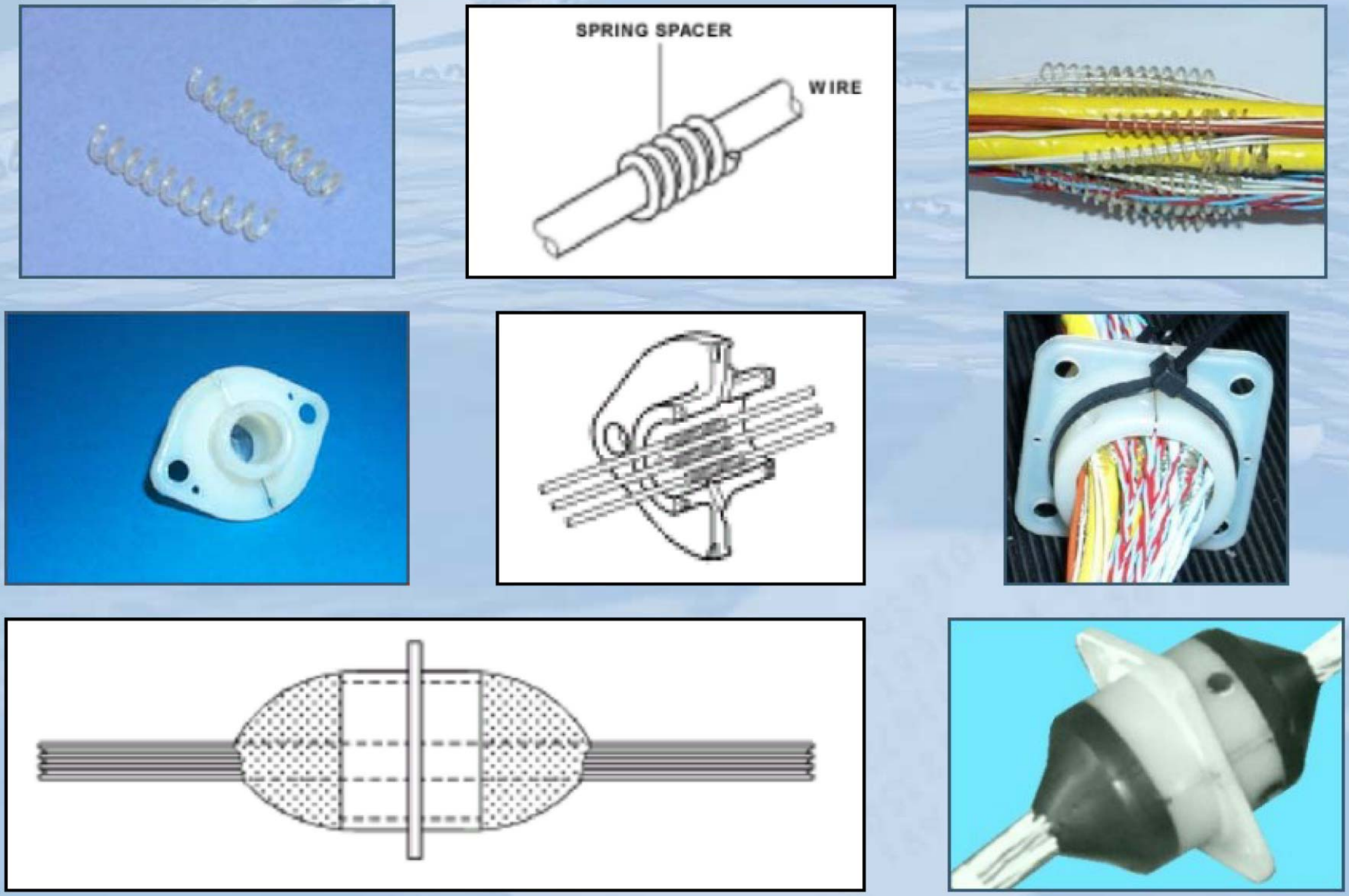
Grommet type
Compound filled type (e.g.: NSA 934710)

Grommet type



PRESSURE SEALS

Compound filled type (e.g.: NSA 934710)



PRESSURE SEALS

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PRESSURE SEALS

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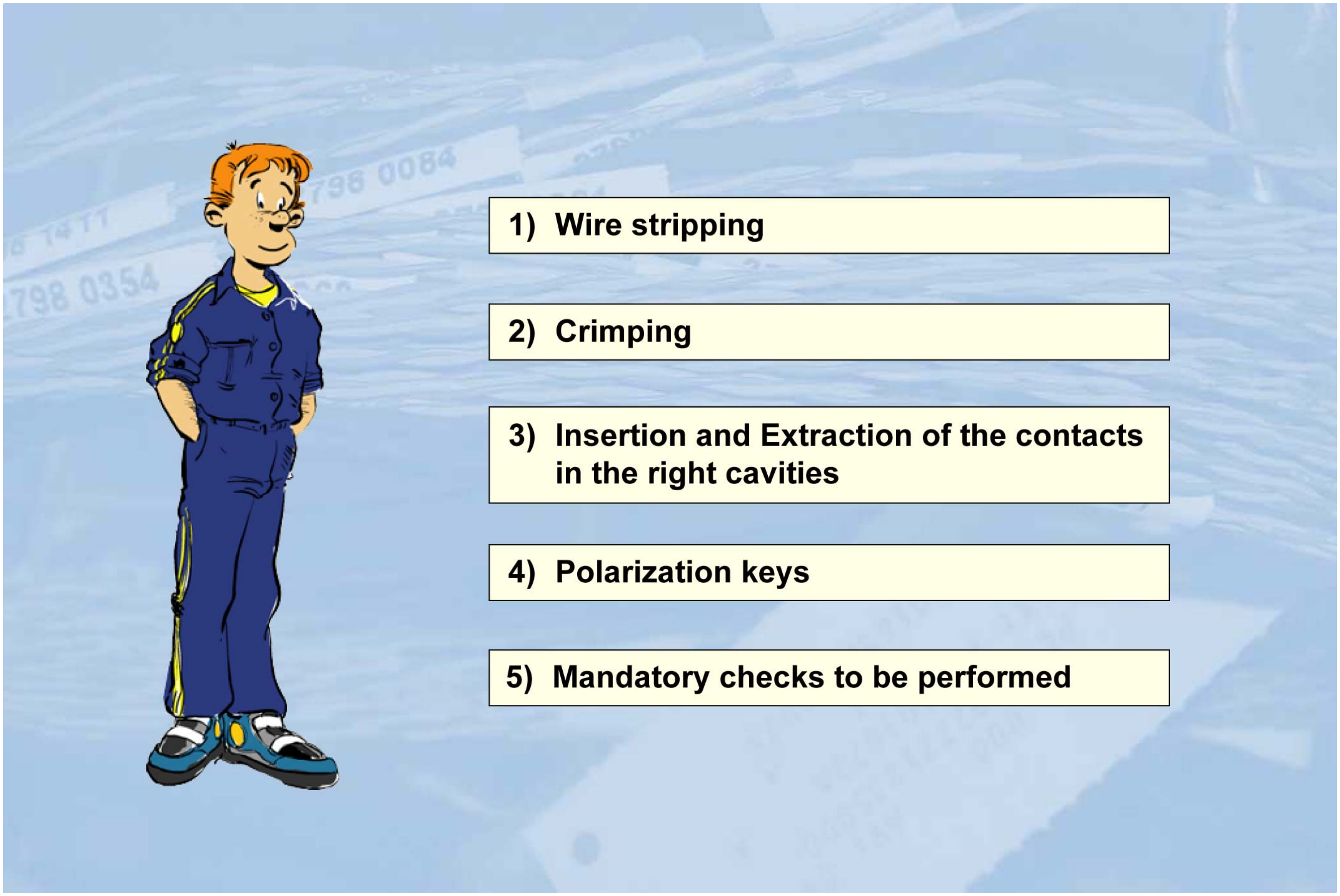
RECTANGULAR CONNECTORS

RECTANGULAR CONNECTORS

1) Wire stripping
2) Crimping
3) Insertion and extraction of the contacts in the right cavities
4) Polarization keys
5) Mandatory checks to be performed
1) Wire stripping
2) Crimping
3) Insertion and extraction of the contacts in the right cavities
4) Polarization keys
5) Mandatory checks to be performed



RECTANGULAR CONNECTORS

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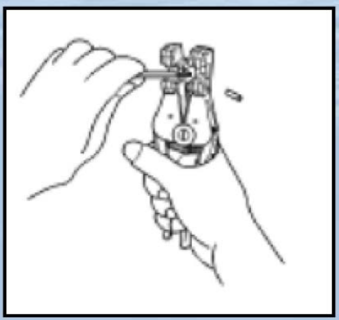
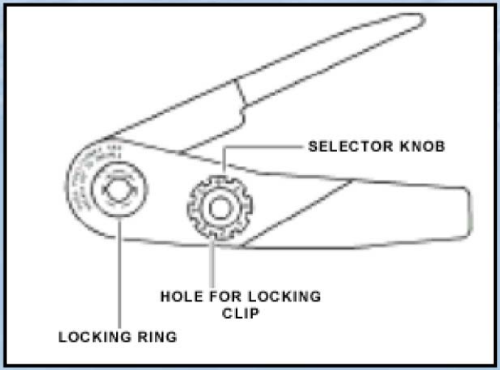
1) Wire stripping



RECTANGULAR CONNECTORS

2) Crimping



RECTANGULAR CONNECTORS

3) Insertion and Extraction of the contacts in the right cavities

RECTANGULAR CONNECTORS

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4) Polarization keys

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- push forward. When the collar passes through the clip, a small click may be heard and the locking felt,
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R NO SIGNIFICANT MOVEMENT MUST BE FELT, OTHERWISE, THE INSERTION
R OPERATION MUSTBE REPEATED.
R

- if locking is correct, remove the tool from the cable.

NOTE : : During the insertion or extraction operations with the tool, rotation must not be applied to the tool to avoid :
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- breaking the pen. In this case, debris may remain in the cavities preventing correct locking and the possibility of release.

3. Extraction of Contacts

A. Extraction of Wired Contacts
(Ref. Fig. 003)
...act (Ref. 20-48-XX).
...ted into the opening
...the cavity until it
...ip portion of the pen
...ct from the cavity.

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R OPERATION MUSTBE REPEATED.
R

B. Extraction of Unwired Contacts
(Ref. Fig. 004)
- select the tool end fitting to suit the type and size of contact and fit it to the tool.
- insert the tool in the selected cavity.
- slide in the tool until it comes into contact with the stop, force the barrel of the contact slighty inside the end fitting ; the outside of the end fitting retracts the clip tabs.
- pull the tool/contact assembly out of the cavity.
- use the piston of the tool to drive the contact off the end fitting.

NOTE : : During the insertion or extraction operations with the tool, rotation must not be applied to the tool to avoid :
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RECTANGULAR CONNECTORS

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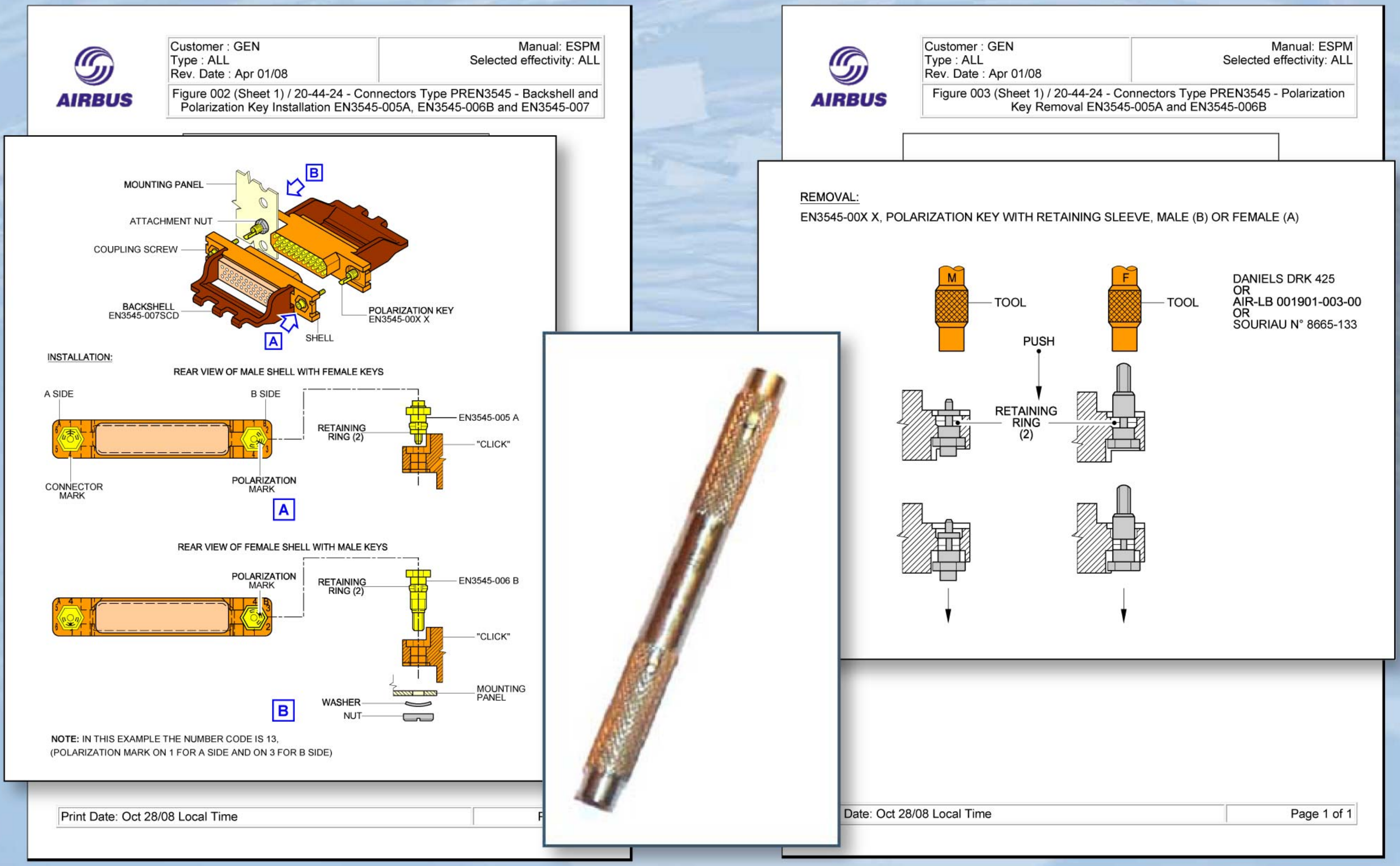
5) Mandatory checks to be performed



RECTANGULAR CONNECTORS

X8U08481 - X0332T0 - XM2043000000001

RECTANGULAR CONNECTORS

TERMINAL BLOCKS MODULAR

TERMINAL BLOCKS MODULAR

1) Installation of modules on the rail
2) Installation of the end clamp
3) Installation of the locking wire
4) Installation of the module identification label
5) Wire stripping
6) Crimping
7) Insertion and Extraction of the contacts in the right cavities
1) Installation of modules on the rail
2) Installation of the end clamp
3) Installation of the locking wire
4) Installation of the module identification label
5) Wire stripping
6) Crimping
7) Insertion and Extraction of the contacts in the right cavities

1) Installation of modules on the rail

2) Installation of the end clamp

3) Installation of the locking wire

4) Installation of the module identification label

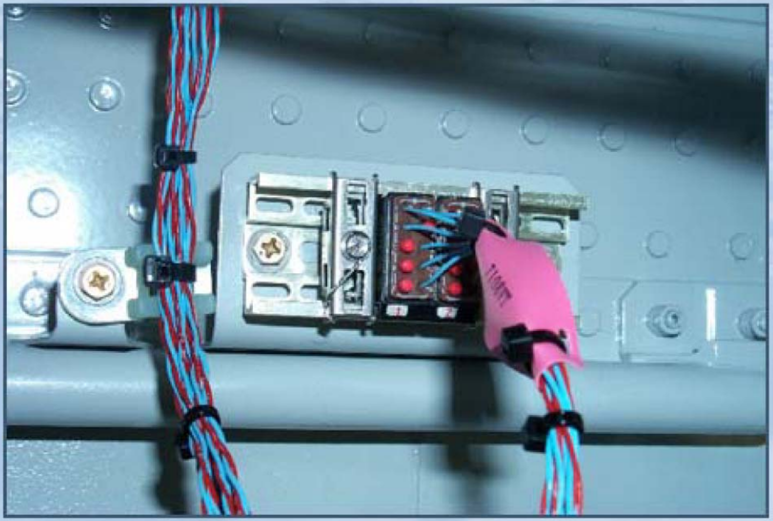
5) Wire stripping

6) Crimping

7) Insertion and Extraction of the contacts in the right cavities

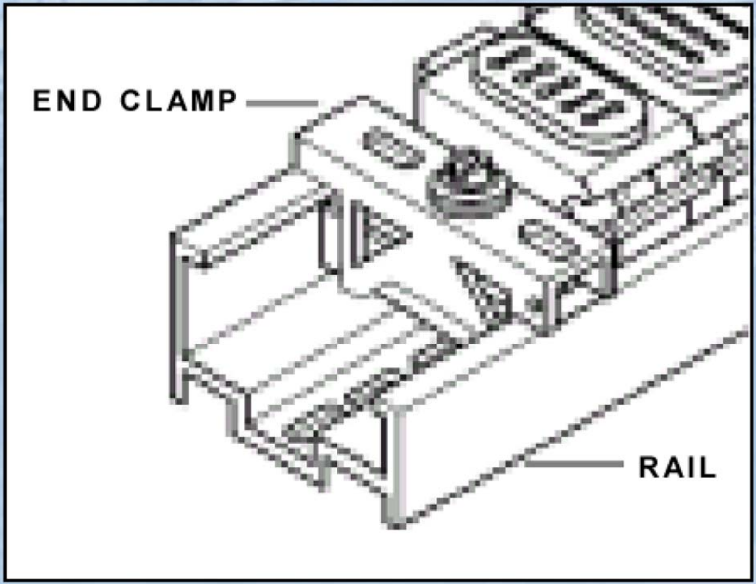
TERMINAL BLOCKS MODULAR

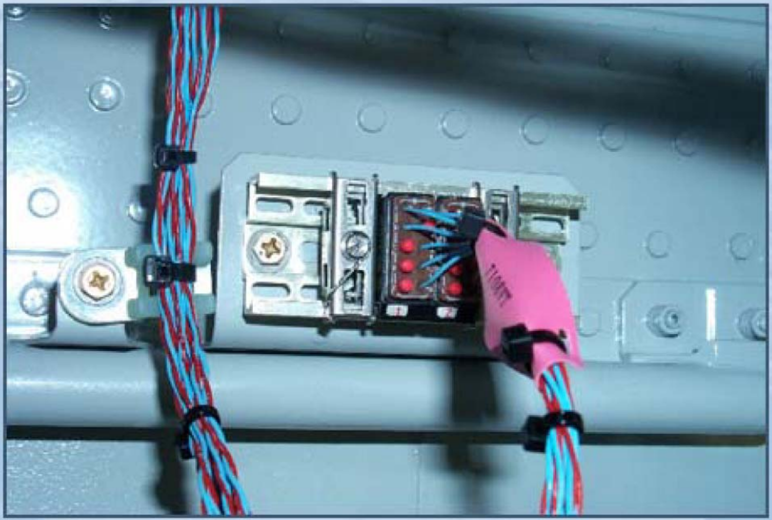
1) Installation of modules on the rail



TERMINAL BLOCKS MODULAR

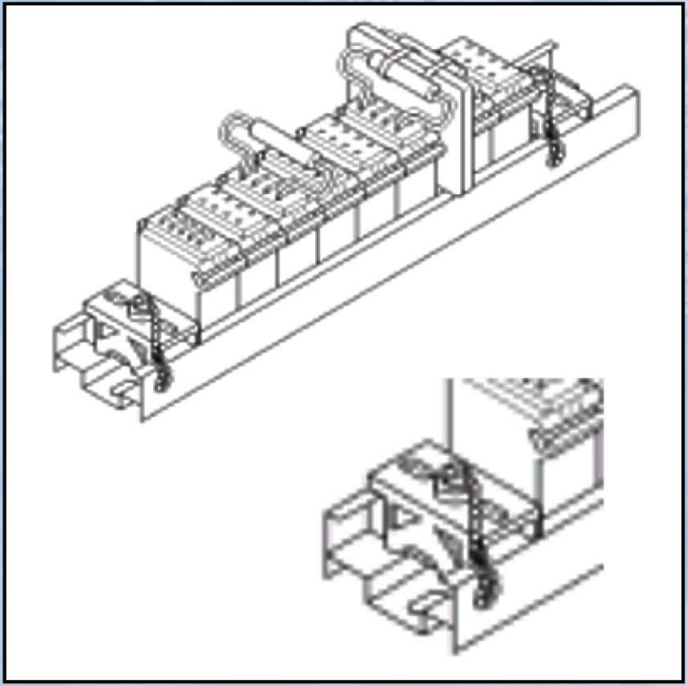
2) Installation of the end clamp

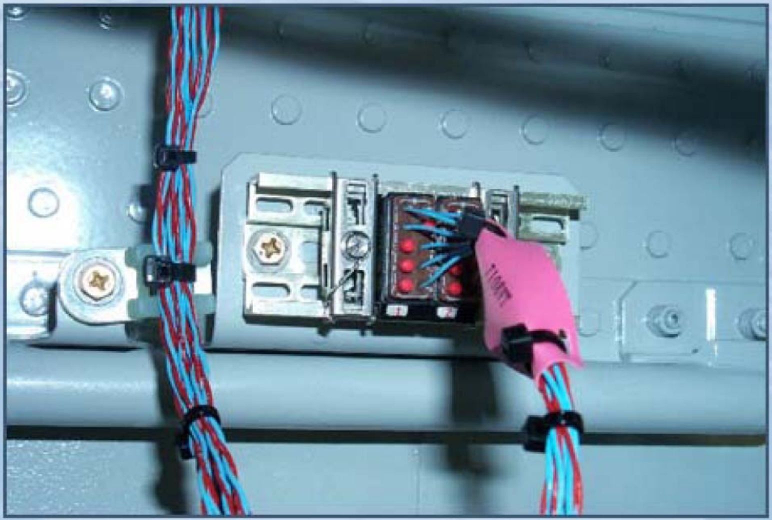




TERMINAL BLOCKS MODULAR

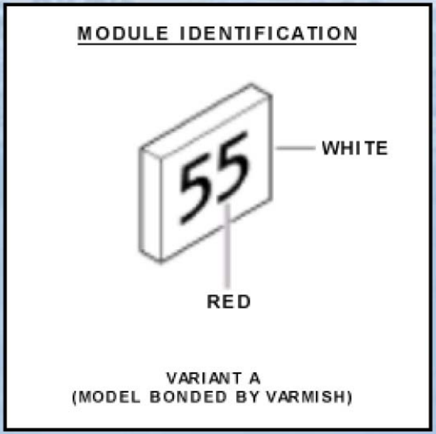
3) Installation of the locking wire

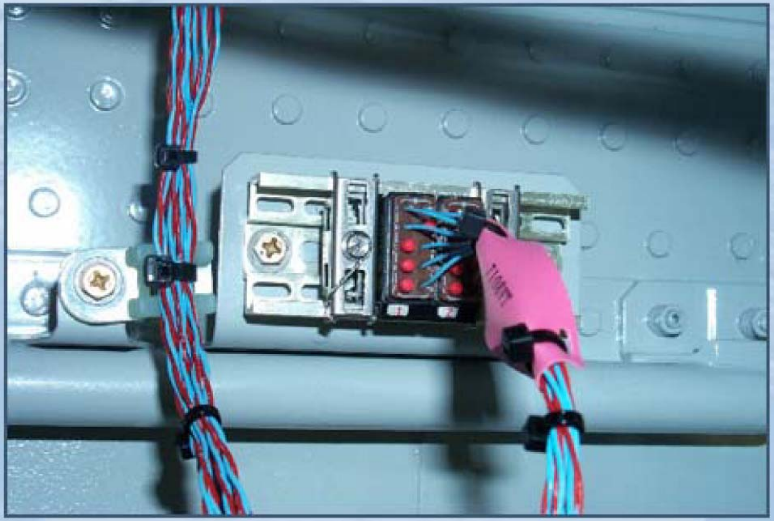




TERMINAL BLOCKS MODULAR

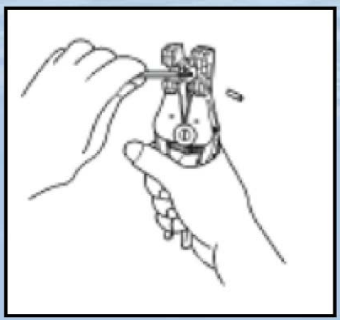
4) Installation of the module identification label





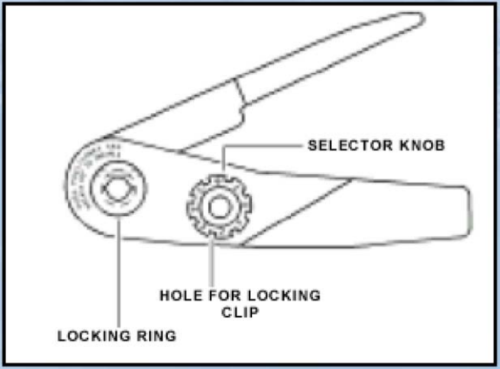
TERMINAL BLOCKS MODULAR

5) Wire stripping



TERMINAL BLOCKS MODULAR

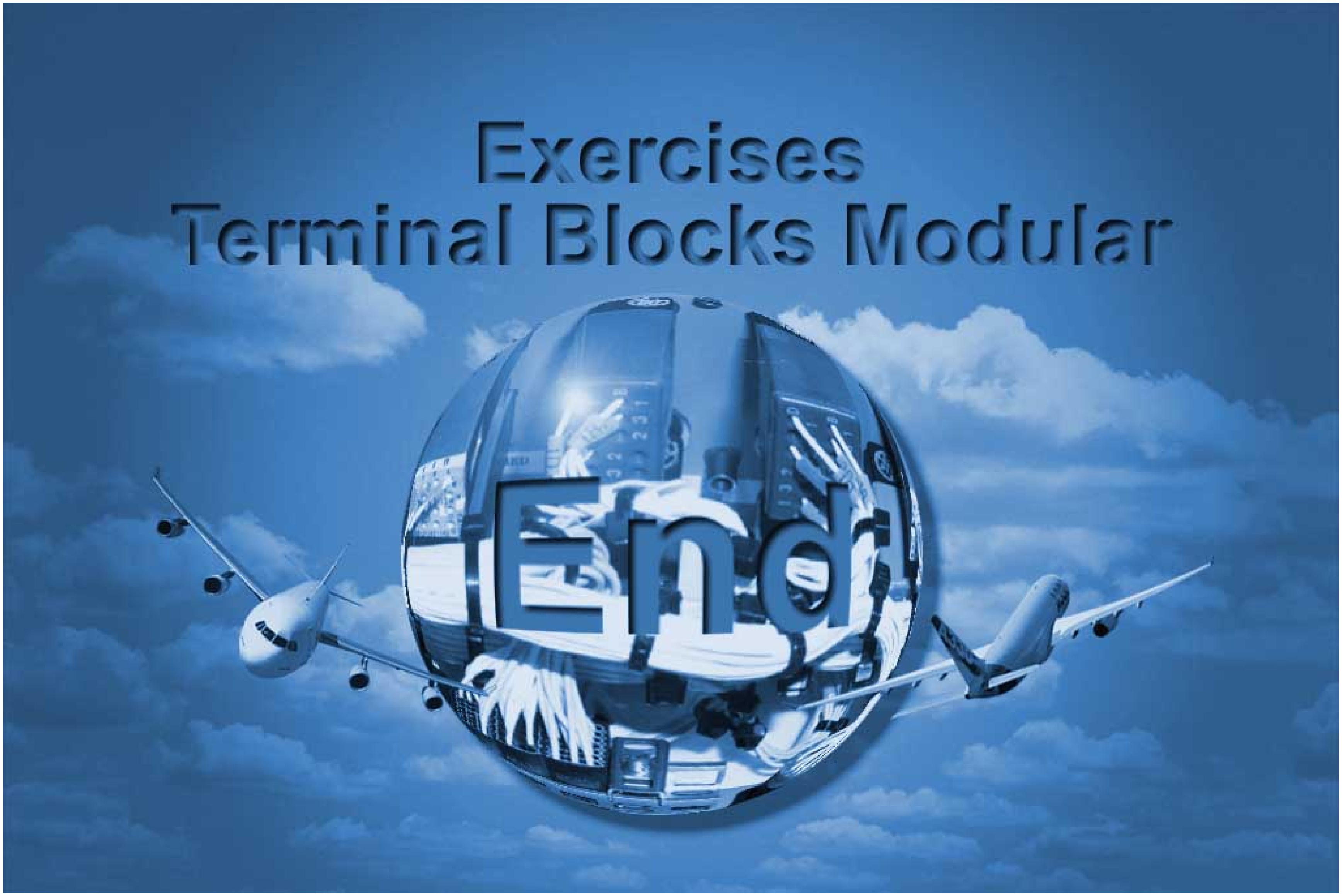
6) Crimping



TERMINAL BLOCKS MODULAR

7) Insertion and Extraction of the contacts in the right cavities

TERMINAL BLOCKS MODULAR



TERMINAL BLOCKS MODULAR

TERMINAL BLOCKS NON MODULAR

TERMINAL BLOCKS NON MODULAR

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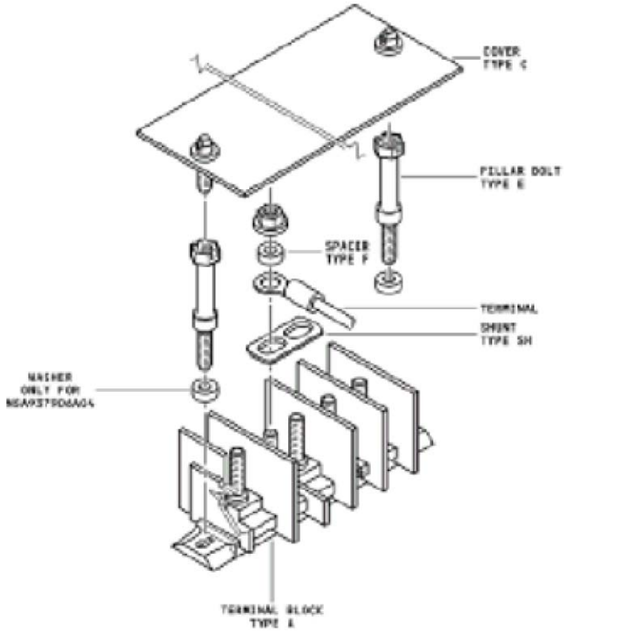
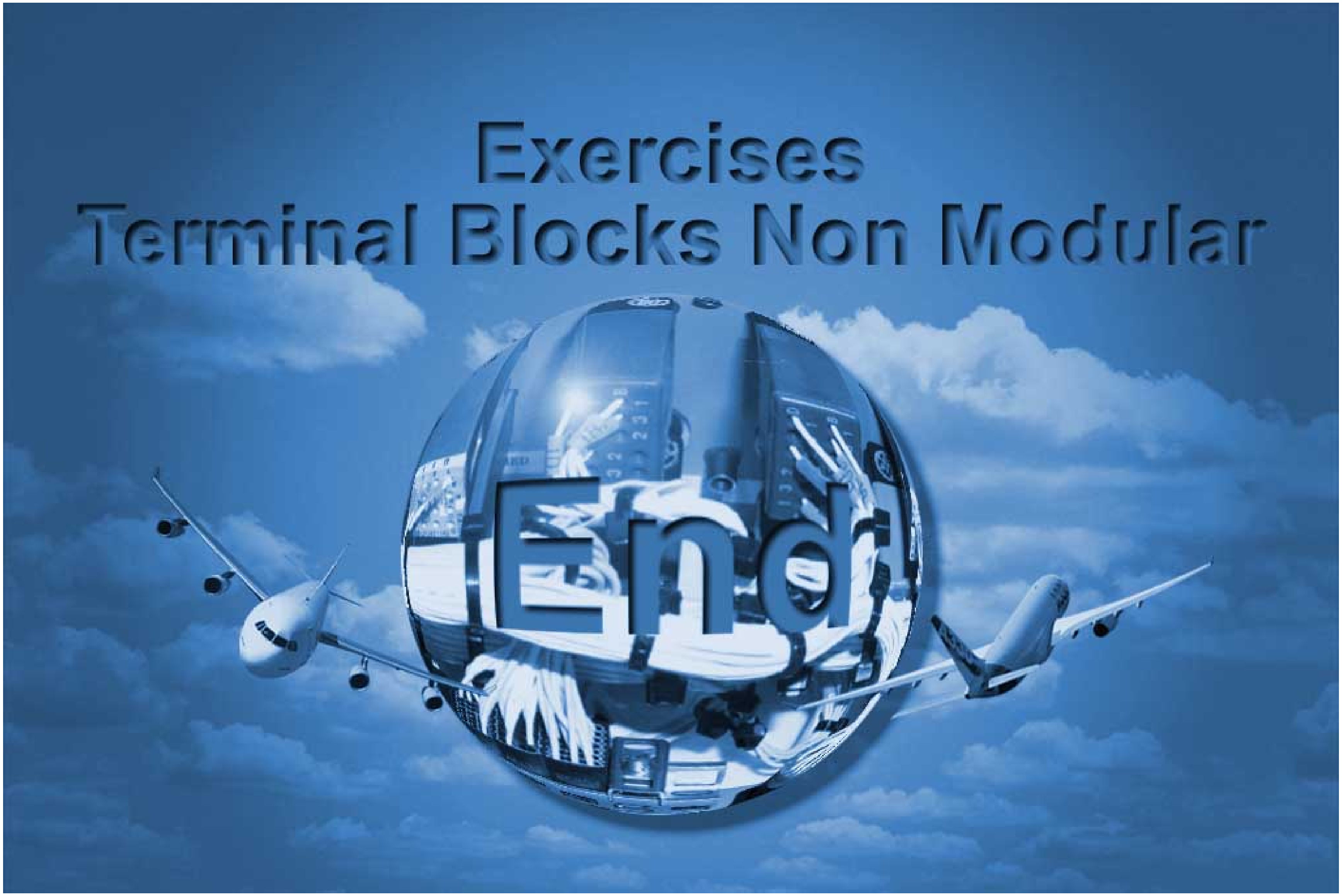


TORQUE VALUE					
CONNECTION		ATTACHMENT		COVER SCREW	
MINI	MAX	MINI	MAX	MINI	MAX
0.41 m.daN (36.29 lbf.in)	0.45 m.daN (39.82 lbft.ft)	0.25 m.daN (22.13 lbf.in)	0.30 m.daN (26.56 lbft.in)	0.08 m.daN (7.07 lbf.in)	0.10 m.daN (8.84 lbf.in)

TERMINAL BLOCKS NON MODULAR



TERMINAL BLOCKS NON MODULAR

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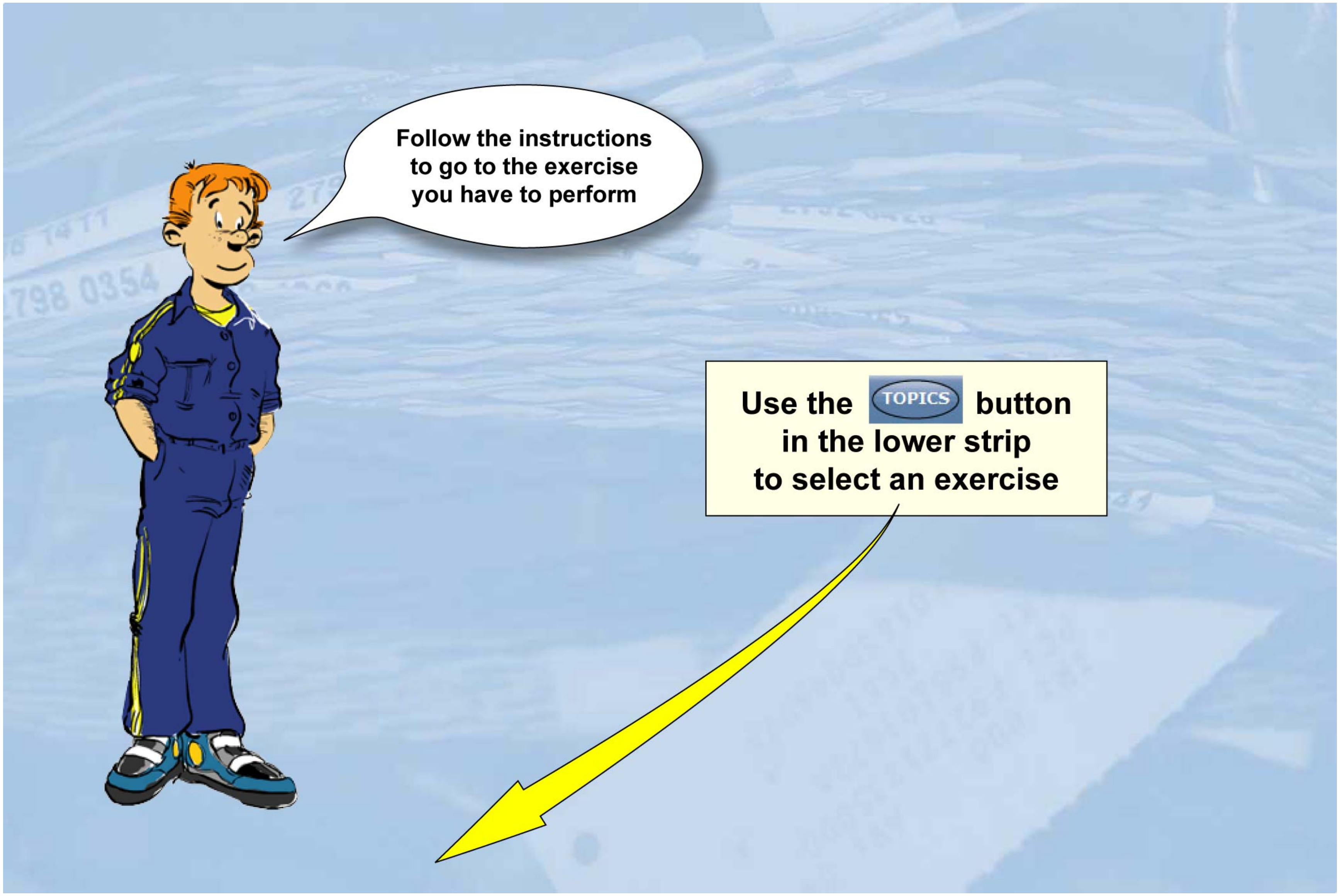
TSM

VIEWING INSTRUCTIONS

Follow the instructions to go to the exercise you have to perform.



VIEWING INSTRUCTIONS

TSM

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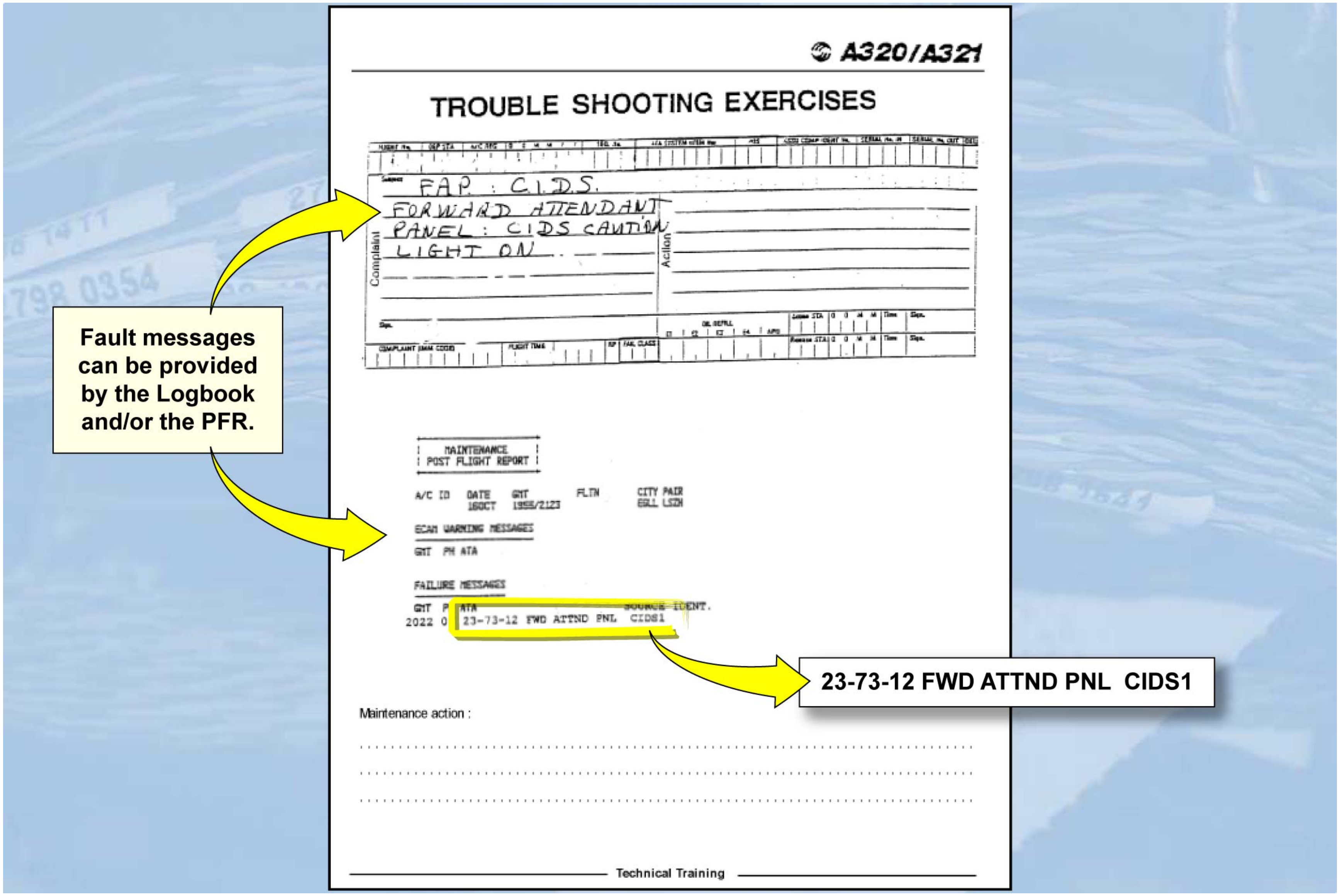
The Logbook and/or the PFR can provide fault messages.
Here is a summary of all the actions you have to accomplish to complete the exercise.


A320/A321
TROUBLE SHOOTING EXERCISES
FAP : C.I.D.S.
FORWARD ATTENDANT
PANEL : CIDS CAUTION
LIGHT ON
Complaint
Action
Fault messages can be provided by the Logbook and/or the PFR.
MAINTENANCE POST FLIGHT REPORT
A/C ID
DATE 16OCT
GMT 1956/2123
FLTN
CITY PAIR EGLL LSZH
ECAM WARNING MESSAGES
GMT PH ATA
FAILURE MESSAGES
GMT PH ATA SOURCE IDENT.
2022 0 23-73-12 FWD ATTND PNL CIDS1
23-73-12 FWD ATTND PNL CIDS1
Maintenance action :
Technical Training

EN

Here is a summary of all the actions you have to accomplish to complete the exercise.

323LO5.XLS

TROUBLE-SHOOTING EXERCISE FOLLOW-UP SHEET

EX No: 5 — FAILURE :FAULT IN THE FORWARD ATTENDANT PANEL.

PROCEDURE

Step	A/C DOC	ACTION	RESULT
1	SIL 28 IF NO FILTER INSTALLED	MESSAGE CROSS CHECK	MESSAGE NOT LISTED.
2	MMEL:COMMUNICATION.	SEE REMARKS OR EXCEPTIONS	MESSAGE NOT LISTED .DOESN'T AFFECT THE AIRWORTHINESS => DISPATCH IS APPROVED
3	TSM I LOCAL SECTION	FIND THE RELEVANT IN THE LIST AND MAKE CORRELATION I LOCAL page 1	TSM 23-LOCAL
4	TSM page block 100 23-LOCAL	FIND THE RELEVANT TSM TASK page A203	TASK 23-73-00-810-838
5	TSM	FAULT CONFIRMATION	3-A DO THE FAP TEST THROUGH THE CFDS.
6	TSM	TEST PERFORMANCE	MAINTENANCE MESSAGE AFTER TEST : FWD ATTND PNL . 4-B REPLACE THE FAP (120RH) (AMM 23-73-12-000-001 and 23-73-12-400-001)
7	AWL	FIND THE PART NUMBER OF THE 120RH	FIN 120 RH => Z130H0054110 . SPARE PART OK .
8	TSM	FAULT ISOLATION	AFTER REPLACEMENT THE FAULT CONTINUES.DO THE PROCEDURE DESCRIBED ON PARA 4-C AFTER REMOVING OF THE DIR-CIDS (101RH) (AMM 23-73-34-000-001)
9	TSM	FAULT ISOLATION	THE CFDS GIVES THE SAME MESSAGE .4-D DO A CHECK AND REPAIR THE WIRING.
10	AWM	FAULT ISOLATION	THERE IS AN OPEN CIRCUIT BETWEEN 120RH 17 AND GROUND . THE RETAINERS OF THE PIN D (TERMINAL BLOCK 2749 VT 10) ARE BROKEN .REPLACE THE PIN.
11	AWL :HOOK-UP LIST.	FIND THE P/N OF THE CONTACT.	91-32-74 page 14 FIN 2749 VT 10 D => P/N : EN3155-016M2018
12	AWL:20-00-00 page 53	FIND THE RELEVANT ASN/NSA AND THE TOPIC NUMBER	NSA937910EA2000 => 20-48-25
13	AWL: 20-48-25	FIND THE SPECIFICATIONS AND THE TOOLS	SPARE PART OK. AFTER REPLACEMENT THE FAULT DISAPPEARS .
14	TSM	CLOSE UP	4-E INSTALL THE REMOVED DIR-CIDS (AMM 23-73-34-4000-001)
15	TSM	TEST	DO THE TEST GIVEN IN PARA 3-A : TEST OK
16	LOG BOOK	FILL IN THE RELEVANT PAGE WITH MAINTENANCE ACTION AND PROCEDURE RESULTS.	A/C DISPATCH.

Page 1

EN

AIRBUS INDUSTRIE
TROUBLE SHOOTING MANUAL

LOCAL CH-PB101

CTR TK PUMP 1 FAULT legend on 28-ECAM
CTR TK PUMP 1 FAULT legend on 28-LOCAL
CTR TK PUMP 1 P/BSW FAULT legend off 28-ECAM
CTR TK PUMP 1 P/BSW FAULT legend off 28-LOCAL
CTR TK PUMP 1 P/BSW FAULT legend off 28-OBSV
CTR TK PUMP 1 P/BSW OFF legend on 28-ECAM
CTR TK PUMP 1 P/BSW OFF legend on 28-LOCAL
CTR TK PUMP 2 FAULT legend on 28-ECAM
CTR TK PUMP 2 FAULT legend on 28-LOCAL
CTR TK PUMP 2 P/BSW FAULT legend off 28-ECAM
CTR TK PUMP 2 P/BSW FAULT legend off 28-LOCAL
CTR TK PUMP 2 P/BSW FAULT legend off 28-OBSV
CTR TK PUMP 2 P/BSW OFF legend on 28-ECAM
CTR TK PUMP 2 P/BSW OFF legend on 28-LOCAL
CTR TK R XFR P/BSW OFF legend on 28-ECAM
CTR TK R XFR P/BSW OFF legend on 28-LOCAL
L TK PUMPS 1 P/BSW FAULT legend off 28-ECAM
L TK PUMPS 1 P/BSW FAULT legend off 28-LOCAL
L TK PUMPS 1 P/BSW FAULT legend off 28-OBSV
L TK PUMPS 1 P/BSW FAULT legend on 28-ECAM
L TK PUMPS 1 P/BSW FAULT legend on 28-LOCAL
L TK PUMPS 1 P/BSW FAULT legend on 28-OBSV
L TK PUMPS 2 P/BSW FAULT legend off 28-ECAM
L TK PUMPS 2 P/BSW FAULT legend off 28-LOCAL
L TK PUMPS 2 P/BSW FAULT legend off 28-OBSV
L TK PUMPS 2 P/BSW FAULT legend on 28-ECAM
L TK PUMPS 2 P/BSW FAULT legend on 28-LOCAL
L TK PUMPS 2 P/BSW FAULT legend on 28-OBSV
R TK PUMPS 1 P/BSW FAULT legend off 28-ECAM
R TK PUMPS 1 P/BSW FAULT legend off 28-LOCAL
R TK PUMPS 1 P/BSW FAULT legend off 28-OBSV
R TK PUMPS 1 P/BSW FAULT legend on 28-ECAM
R TK PUMPS 1 P/BSW FAULT legend on 28-LOCAL
R TK PUMPS 1 P/BSW FAULT legend on 28-OBSV
R TK PUMPS 2 P/BSW FAULT legend off 28-ECAM
R TK PUMPS 2 P/BSW FAULT legend off 28-LOCAL
R TK PUMPS 2 P/BSW FAULT legend off 28-OBSV
R TK PUMPS 2 P/BSW FAULT legend on 28-ECAM
R TK PUMPS 2 P/BSW FAULT legend on 28-LOCAL
R TK PUMPS 2 P/BSW FAULT legend on 28-OBSV

FWD ATTND Pnl (Z221)

CIDS CAUT LT CAUT LT on 23-LOCAL

R GPWS Pnl (21VU)

FAULT legend of GPWS/SYS pushbutton switch on 34-LOCAL

EFF : ALL

I-LOCAL Page 10
Apr 01/02

EN

X8U08481 - X0332T0 - XM203700000001

A319/A320/A321
TROUBLE SHOOTING MANUAL

COMMUNICATIONS - FAULT SYMPTOMS

	WARNINGS/MALFUNCTIONS	CFDS FAULT MESSAGES				FAULT ISOLATION PROCEDURE
		SOURCE	MESSAGE	ATA	C	
	FWD ATTND Pnl (Z221)					
R	CIDS CAUT LT CAUT LT on	CIDS 1	CAM	237319	1	237300 PA210 T 810 857
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS MID BUS L	237300	1	237300 P 291 T 810 836
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS MID BUS R	237300	1	237300 P 297 T 810 837
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS TOP BUS 1 L	237300	1	237300 P 267 T 810 832
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS TOP BUS 1 R	237300	1	237300 P 279 T 810 834
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS TOP BUS 2 L	237300	1	237300 P 273 T 810 833
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS TOP BUS 2 R	237300	1	237300 P 285 T 810 835
	CIDS CAUT LT CAUT LT on	CIDS 1	DRAINMAST HEATER AFT	307151	1	307100 P 203 T 810 802
	CIDS CAUT LT CAUT LT on	CIDS 1	DRAINMAST HEATER FWD	307151	1	307100 P 201 T 810 801
	CIDS CAUT LT CAUT LT on	CIDS 1	DRAINMAST UNIT AFT	307134	1	307100 P 207 T 810 804
	CIDS CAUT LT CAUT LT on	CIDS 1	DRAINMAST UNIT FWD	307134	1	307100 P 205 T 810 803
R	CIDS CAUT LT CAUT LT on	CIDS 1	FWD ATTND PNL	237312	1	237300 PA203 T 810 838
	CIDS CAUT LT CAUT LT on	CIDS 1	NO CAM DATA	237319	1	237300 PA218 T 810 860

EFF : ALL

23·LOCAL Page 101
Apr 01/02

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EN

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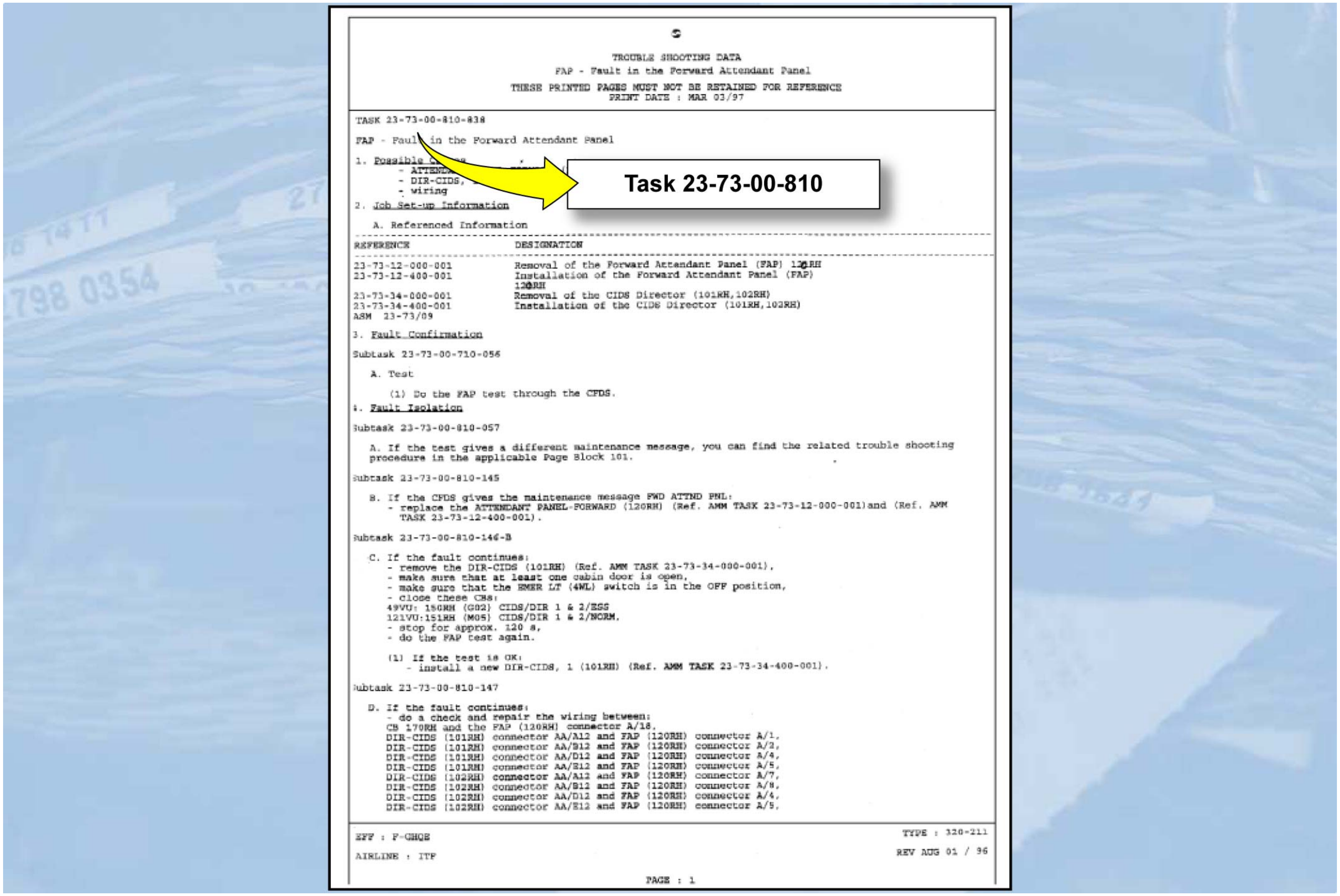

TROUBLE SHOOTING DATA
FAP - Fault in the Forward Attendant Panel
THESE PRINTED PAGES MUST NOT BE RETAINED FOR REFERENCE
PRINT DATE : MAR 03/97

TASK 23-73-00-810-838

FAP - Fault in the Forward Attendant Panel

1. Possible Causes
   - ATTEND...
   - DIR-CIDS, ...
   - wiring

2. Job Set-up Information

A. Referenced Information

REFERENCE	DESIGNATION
23-73-12-000-001	Removal of the Forward Attendant Panel (FAP) 120RH
23-73-12-400-001	Installation of the Forward Attendant Panel (FAP) 120RH
23-73-34-000-001	Removal of the CIDS Director (101RH,102RH)
23-73-34-400-001	Installation of the CIDS Director (101RH,102RH)
ASM 23-73/09	

3. Fault Confirmation

Subtask 23-73-00-710-056

A. Test

(1) Do the FAP test through the CFDS.

4. Fault Isolation

Subtask 23-73-00-810-057

A. If the test gives a different maintenance message, you can find the related trouble shooting procedure in the applicable Page Block 101.

Subtask 23-73-00-810-145

B. If the CFDS gives the maintenance message FWD ATTND PNL:
   - replace the ATTENDANT PANEL-FORWARD (120RH) (Ref. AMM TASK 23-73-12-000-001)and (Ref. AMM TASK 23-73-12-400-001).

Subtask 23-73-00-810-146-B

C. If the fault continues:
   - remove the DIR-CIDS (101RH) (Ref. AMM TASK 23-73-34-000-001),
   - make sure that at least one cabin door is open,
   - make sure that the EMER LT (4WL) switch is in the OFF position,
   - close these CBs:
   49VU: 150RH (G02) CIDS/DIR 1 & 2/ESS
   121VU:151RH (M05) CIDS/DIR 1 & 2/NORM.
   - stop for approx. 120 s,
   - do the FAP test again.

   (1) If the test is OK:
      - install a new DIR-CIDS, 1 (101RH) (Ref. AMM TASK 23-73-34-400-001).

Subtask 23-73-00-810-147

D. If the fault continues:
   - do a check and repair the wiring between:
   CB 170RH and the FAP (120RH) connector A/18,
   DIR-CIDS (101RH) connector AA/A12 and FAP (120RH) connector A/1,
   DIR-CIDS (101RH) connector AA/B12 and FAP (120RH) connector A/2,
   DIR-CIDS (101RH) connector AA/D12 and FAP (120RH) connector A/4,
   DIR-CIDS (101RH) connector AA/E12 and FAP (120RH) connector A/5,
   DIR-CIDS (102RH) connector AA/A12 and FAP (120RH) connector A/7,
   DIR-CIDS (102RH) connector AA/B12 and FAP (120RH) connector A/8,
   DIR-CIDS (102RH) connector AA/D12 and FAP (120RH) connector A/4,
   DIR-CIDS (102RH) connector AA/E12 and FAP (120RH) connector A/5.

EFF : F-GHQE
AIRLINE : ITF
TYPE : 320-211
REV AUG 01 / 96
PAGE : 1

EN

TROUBLE SHOOTING DATA

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PRINT DATE : MAR 03/97

FAP (120RH) connector A/3 and GND,
FAP (120RH) connector A/6 and GND,
FAP (120RH) connector A/17 and GND (Ref. ASM 23-73/09).

Subtask 23-73-00-810-148

E. Install the removed DIR-CIDS (101RH) (Ref. AMM TASK 23-73-34-400-001).

Subtask 23-73-00-810-149

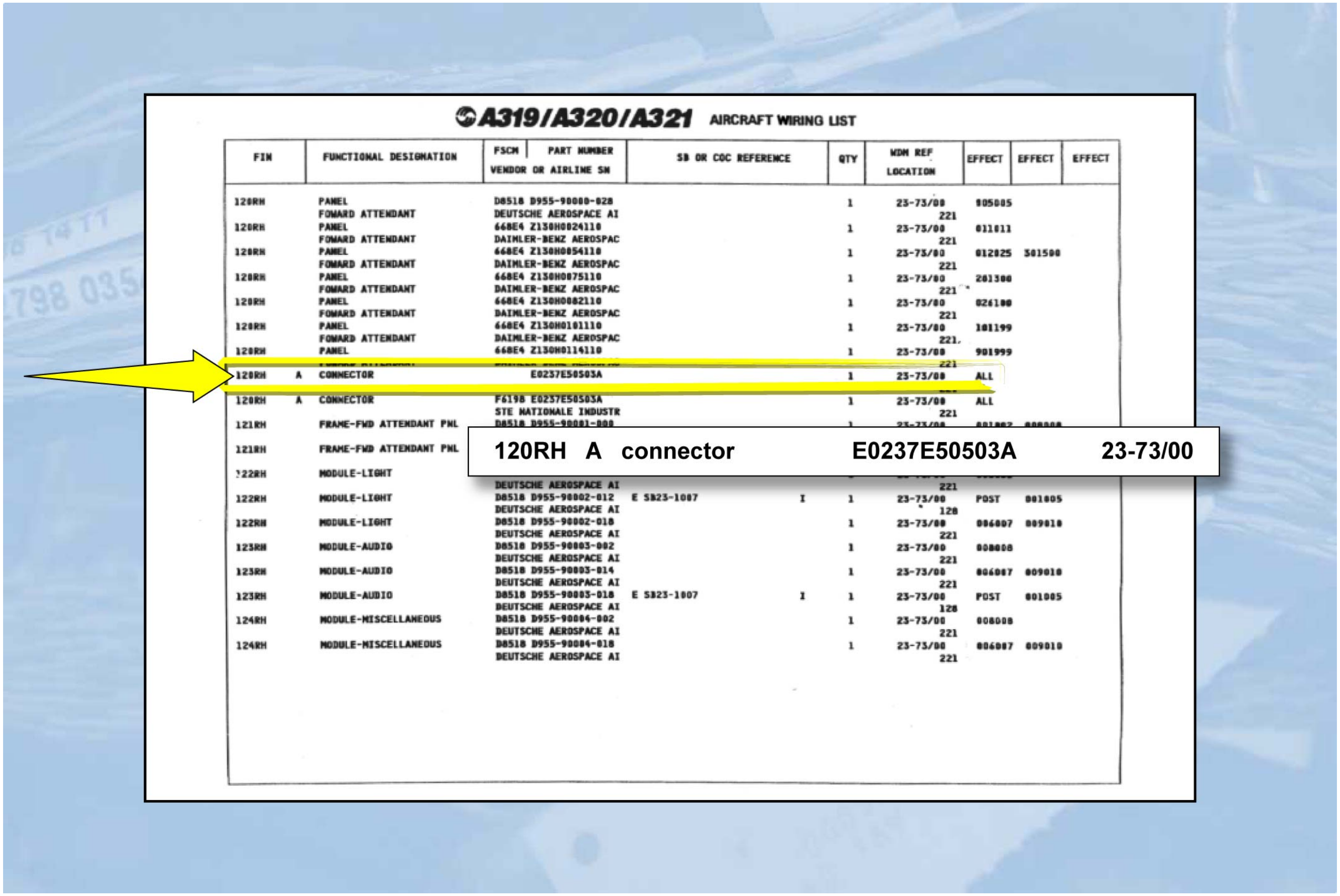
F. Do the test given in Para. 3.A.

EFF : F-GHQE
AIRLINE : ITF

TYPE : 320-211
REV AUG 01 / 96

PAGE : 2

EN



A319/A320/A321 AIRCRAFT WIRING LIST

FIN		FUNCTIONAL DESIGNATION	FSCM PART NUMBER / VENDOR OR AIRLINE SN	SB OR COC REFERENCE	QTY	WDM REF LOCATION	EFFECT	EFFECT	EFFECT
120RH		PANEL FOWARD ATTENDANT	D8518 D955-90000-028 DEUTSCHE AEROSPACE AI		1	23-73/00 221	005005		
120RH		PANEL FOWARD ATTENDANT	668E4 Z130H0024110 DAIMLER-BENZ AEROSPAC		1	23-73/00 221	011011		
120RH		PANEL FOWARD ATTENDANT	668E4 Z130H0054110 DAIMLER-BENZ AEROSPAC		1	23-73/00 221	012025	301500	
120RH		PANEL FOWARD ATTENDANT	668E4 Z130H0075110 DAIMLER-BENZ AEROSPAC		1	23-73/00 221	201300		
120RH		PANEL FOWARD ATTENDANT	668E4 Z130H0082110 DAIMLER-BENZ AEROSPAC		1	23-73/00 221	026100		
120RH		PANEL FOWARD ATTENDANT	668E4 Z130H0101110 DAIMLER-BENZ AEROSPAC		1	23-73/00 221	101199		
120RH		PANEL	668E4 Z130H0114110		1	23-73/00 221	901999		
120RH	A	CONNECTOR	E0237E50503A		1	23-73/00	ALL		
120RH	A	CONNECTOR	F6198 E0237E50503A STE NATIONALE INDUSTR		1	23-73/00 221	ALL		
121RH		FRAME-FWD ATTENDANT PNL	D8518 D955-90001-000		1	23-73/00	001002	008008	
121RH		FRAME-FWD ATTENDANT PNL							
122RH		MODULE-LIGHT	DEUTSCHE AEROSPACE AI			221			
122RH		MODULE-LIGHT	D8518 D955-90002-012 DEUTSCHE AEROSPACE AI	E SB23-1007 I	1	23-73/00 128	POST	001005	
122RH		MODULE-LIGHT	D8518 D955-90002-018 DEUTSCHE AEROSPACE AI		1	23-73/00 221	006007	009010	
123RH		MODULE-AUDIO	D8518 D955-90003-002 DEUTSCHE AEROSPACE AI		1	23-73/00 221	008008		
123RH		MODULE-AUDIO	D8518 D955-90003-014 DEUTSCHE AEROSPACE AI		1	23-73/00 221	006007	009010	
123RH		MODULE-AUDIO	D8518 D955-90003-018 DEUTSCHE AEROSPACE AI	E SB23-1007 I	1	23-73/00 128	POST	001005	
124RH		MODULE-MISCELLANEOUS	D8518 D955-90004-002 DEUTSCHE AEROSPACE AI		1	23-73/00 221	008008		
124RH		MODULE-MISCELLANEOUS	D8518 D955-90004-018 DEUTSCHE AEROSPACE AI		1	23-73/00 221	006007	009010	

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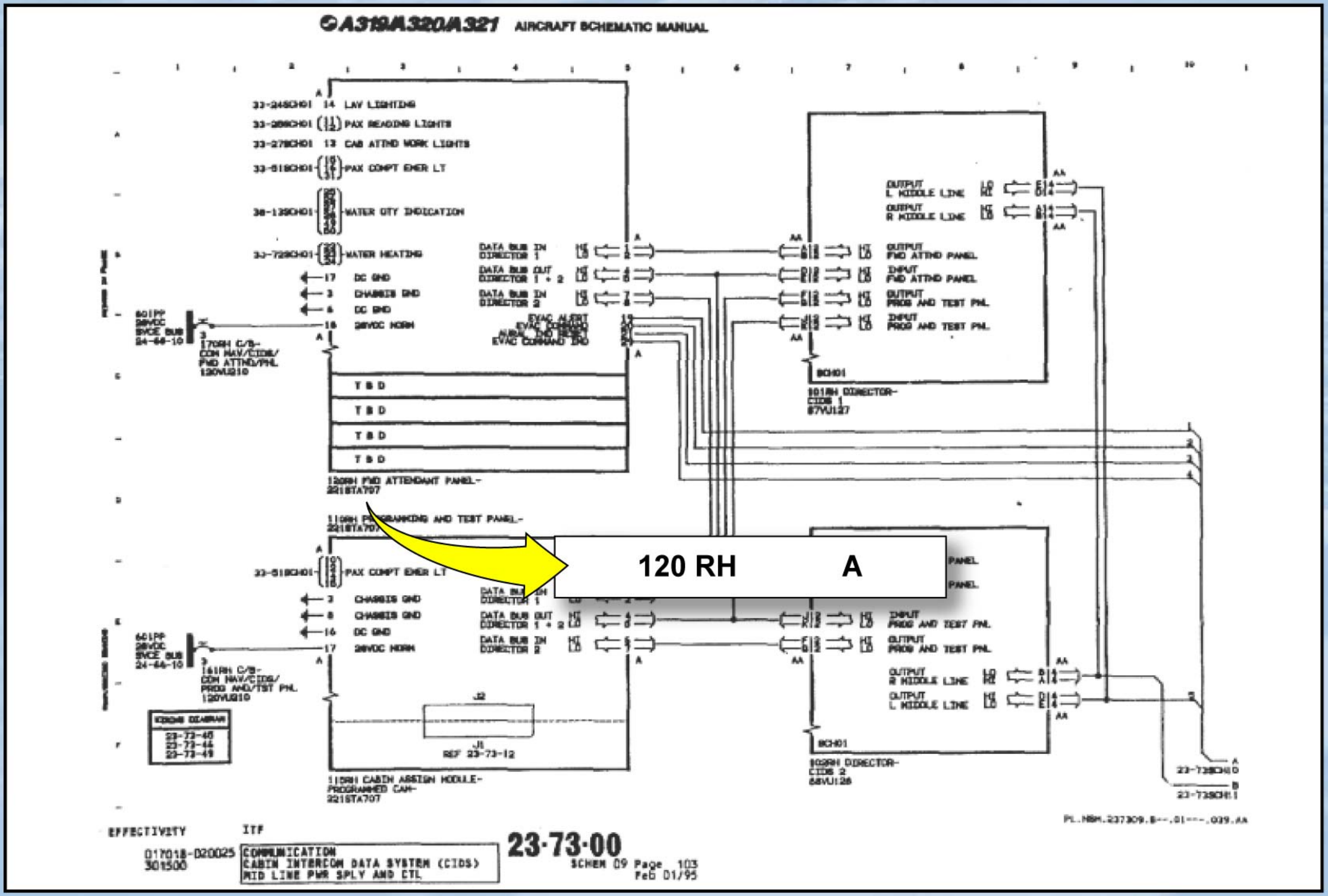

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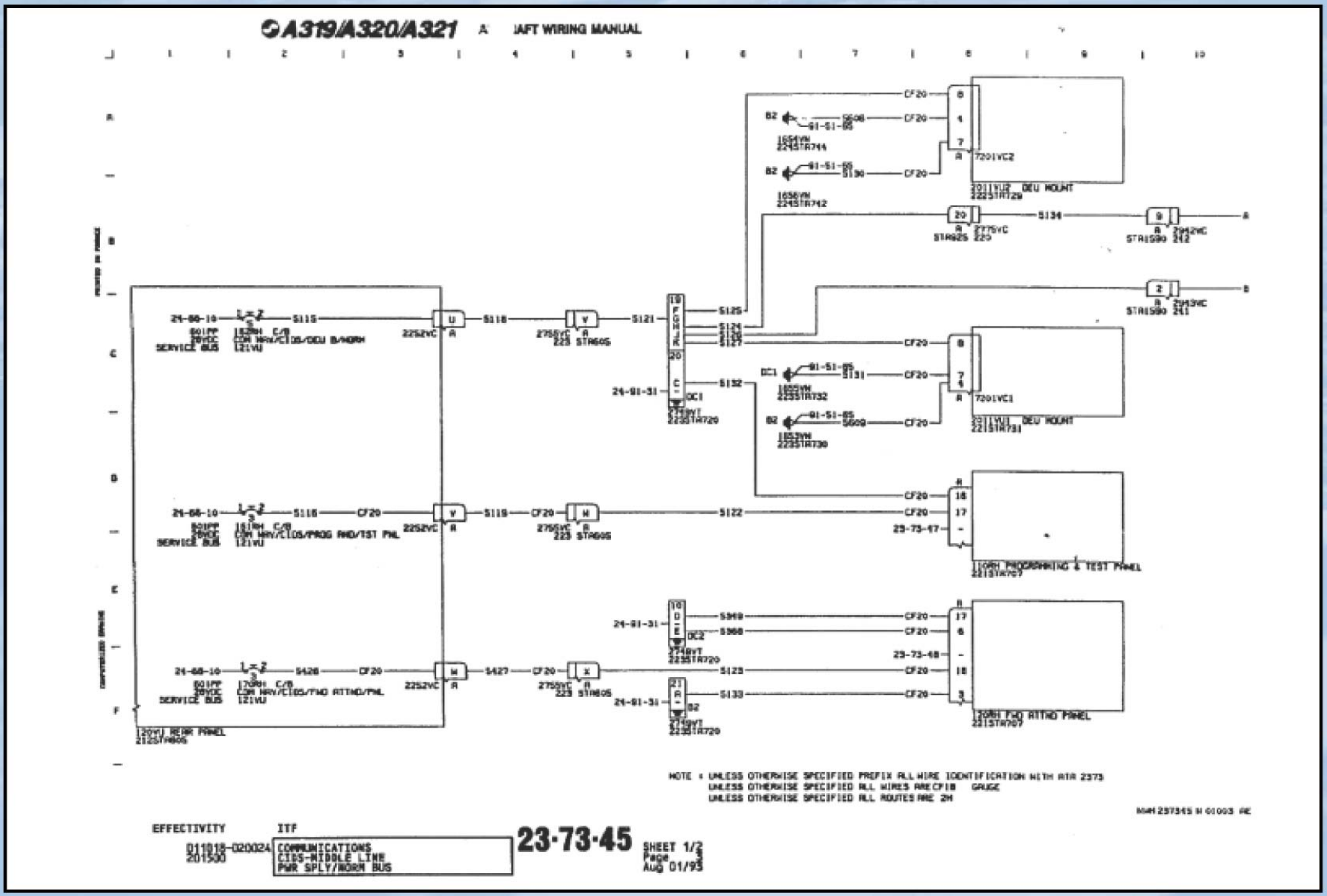
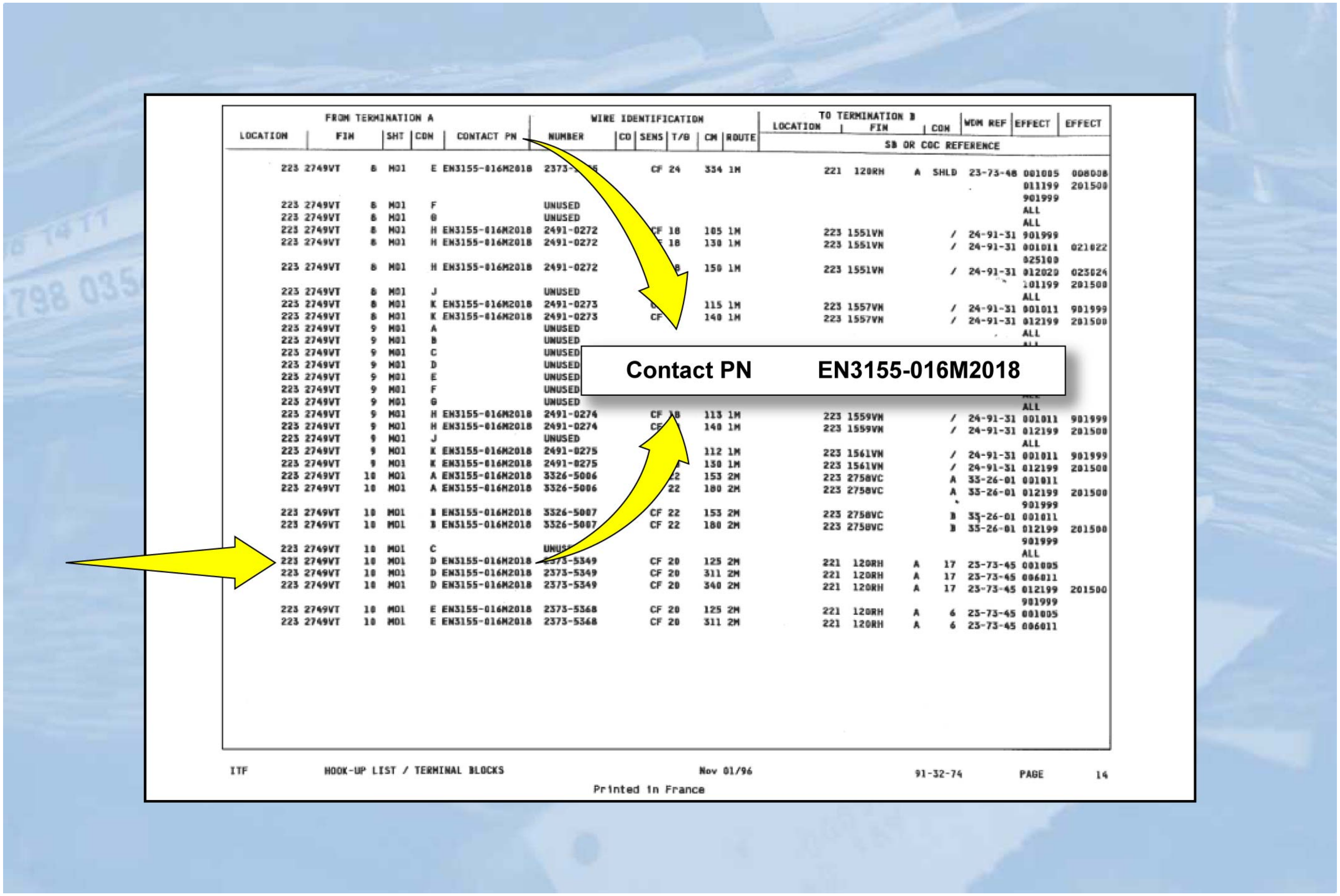

A319/A320/A321
AFT WIRING MANUAL
SERVICE BUS
DEU MOUNT
PROGRAMMING & TEST PANEL
FWD ATTND PANEL
REAR PANEL
NOTE : UNLESS OTHERWISE SPECIFIED PREFIX ALL WIRE IDENTIFICATION WITH ATA 2373
UNLESS OTHERWISE SPECIFIED ALL WIRES ARE CF18 GAUGE
UNLESS OTHERWISE SPECIFIED ALL ROUTES ARE 2H
EFFECTIVITY
ITF
COMMUNICATIONS
CIDS-MIDDLE LINE
PWR SPLY/NORM BUS
23-73-45
SHEET 1/2
AUG 01/93

EN



FROM TERMINATION A LOCATION	FIN	SHT	CON	CONTACT PN	WIRE IDENTIFICATION NUMBER	CD	SENS	T/B	CM	ROUTE	TO TERMINATION B LOCATION	FIN	CON	WDM REF	EFFECT	EFFECT
223	2749VT	8	M01	E EN3155-016M2018	2373-[illegible]5		CF	24	334	1M	221	120RH	A SHLD	23-73-48	001005	008008
															011199	201500
															901999	
223	2749VT	8	M01	F	UNUSED										ALL	
223	2749VT	8	M01	G	UNUSED										ALL	
223	2749VT	8	M01	H EN3155-016M2018	2491-0272		CF	18	105	1M	223	1551VN	/	24-91-31	901999	
223	2749VT	8	M01	H EN3155-016M2018	2491-0272		[illegible]	18	130	1M	223	1551VN	/	24-91-31	001011	021022
															025100	
223	2749VT	8	M01	H EN3155-016M2018	2491-0272		[illegible]	[illegible]	150	1M	223	1551VN	/	24-91-31	012020	025024
															101199	201500
223	2749VT	8	M01	J	UNUSED										ALL	
223	2749VT	8	M01	K EN3155-016M2018	2491-0273		[illegible]	[illegible]	115	1M	223	1557VN	/	24-91-31	001011	901999
223	2749VT	8	M01	K EN3155-016M2018	2491-0273		CF	[illegible]	140	1M	223	1557VN	/	24-91-31	012199	201500
223	2749VT	9	M01	A	UNUSED										ALL	
223	2749VT	9	M01	B	UNUSED										[illegible]	
223	2749VT	9	M01	C	UNUSED											
223	2749VT	9	M01	D	UNUSED											
223	2749VT	9	M01	E	UNUSED											
223	2749VT	9	M01	F	UNUSED										[illegible]	
223	2749VT	9	M01	G	UNUSED										ALL	
223	2749VT	9	M01	H EN3155-016M2018	2491-0274		CF	[illegible]8	113	1M	223	1559VN	/	24-91-31	001011	901999
223	2749VT	9	M01	H EN3155-016M2018	2491-0274		CF	[illegible]	140	1M	223	1559VN	/	24-91-31	012199	201500
223	2749VT	9	M01	J	UNUSED										ALL	
223	2749VT	9	M01	K EN3155-016M2018	2491-0275		[illegible]	[illegible]	112	1M	223	1561VN	/	24-91-31	001011	901999
223	2749VT	9	M01	K EN3155-016M2018	2491-0275		[illegible]	[illegible]	130	1M	223	1561VN	/	24-91-31	012199	201500
223	2749VT	10	M01	A EN3155-016M2018	3326-5006		[illegible]	22	153	2M	223	2758VC	A	33-26-01	001011	
223	2749VT	10	M01	A EN3155-016M2018	3326-5006		[illegible]	22	180	2M	223	2758VC	A	33-26-01	012199	201500
															901999	
223	2749VT	10	M01	B EN3155-016M2018	3326-5007		CF	22	153	2M	223	2758VC	B	33-26-01	001011	
223	2749VT	10	M01	B EN3155-016M2018	3326-5007		CF	22	180	2M	223	2758VC	B	33-26-01	012199	201500
															901999	
223	2749VT	10	M01	C	UNUS[illegible]										ALL	
223	2749VT	10	M01	D EN3155-016M2018	2373-5349		CF	20	125	2M	221	120RH	A 17	23-73-45	001005	
223	2749VT	10	M01	D EN3155-016M2018	2373-5349		CF	20	311	2M	221	120RH	A 17	23-73-45	006011	
223	2749VT	10	M01	D EN3155-016M2018	2373-5349		CF	20	340	2M	221	120RH	A 17	23-73-45	012199	201500
															901999	
223	2749VT	10	M01	E EN3155-016M2018	2373-5368		CF	20	125	2M	221	120RH	A 6	23-73-45	001005	
223	2749VT	10	M01	E EN3155-016M2018	2373-5368		CF	20	311	2M	221	120RH	A 6	23-73-45	006011	

SB OR COC REFERENCE

ITF HOOK-UP LIST / TERMINAL BLOCKS Nov 01/96 91-32-74 PAGE 14
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AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

	EN	TOPIC NUMBER
	EN2714-003B	20-32-21
	EN2714-003C	20-32-21
	EN2714-003D	20-32-21
	EN2714-005A	20-32-21
	EN2714-005B	20-32-21
	EN2714-005C	20-32-21
	EN2714-007A	20-32-21
	EN2714-007B	20-32-21
	EN2714-007C	20-32-21
	EN2714-009A	20-32-21
	EN2714-009B	20-32-21
	EN2714-009C	20-32-21
	EN2714-011B	20-32-21
	EN2714-011C	20-32-21
	EN2714-011D	20-32-21
	EN2714-012B	20-32-21
	EN2854-003B	20-32-21
R	EN2995-005	20-46-10
R	EN2996-004	20-46-10
R	EN2996-005	20-46-10
R	EN2997	20-44-16
	EN3155-003F	20-48-20
		20-48-24
	EN3155-004M	20-48-20
		20-48-24
	EN3155-005F	20-48-20
		20-48-24
	EN3155-008M	20-48-20
	EN3155-012	20-48-39
	EN3155-013	20-48-39
		20-48-24
	EN3155-014M	20-48-20
		20-48-24
	EN3155-015F	20-48-20
		20-48-24
	EN3155-016M	20-48-20
		20-48-24
	EN3155-017F	20-48-20
		20-48-24
	EN3155-018	20-48-20
		20-48-21
	EN3155-019	20-48-20
		20-48-21
	EN3155-042	20-48-39

EFF : ALL

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AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

NORMAL CONTACTS - CONNECTION TABLE - DESCRIPTION AND OPERATION

1. General
   (Ref. Fig. 001, 002, 003)
   This chapter concerns the description, identification and installation of normal contacts

2. Multipurpose Contacts (Ref. 20-48-21)
   - E0395, E0396, NSA938402 , E0380 and E0397 (Dummy contacts).
R - NSA938151, NSA938152, EN3155-018, EN3155-019 and NSA938195 (Dummy
R contact).
   - NSA938193, NSA938194 and E0397 (Dummy contact).
   - NSA938403, E0380 and E0397 (Dummy contacts).

3. Normal Contacts for Arinc 600 Connectors (Ref. 20-48-22)
   - ABS0832.
   - E0170 and E0171.

4. Normal Contacts for MIL Connectors (Ref. 20-48-23)
   - E0347.
   - E0374.
   - E0546 and E0547.
   - E0685.
   - NSA938159, NSA938160, NSA938167, NSA938168 and NSA938189.
   - NSA938164 and NSA938165.
   - NSA938182, NSA938183, CANNON and SOURIAU Contacts.
   - NSA938184 and NSA938185.
   - NSA938192.

5. Normal Contacts for PREN Connectors (Ref. 20-48-24)
R - E0445, E0446, EN3155-004 and EN3155-005
R - EN3155-003, EN3155-008, EN3155-014 and EN3155-015
   - EN3155-016
R - EN3155-017
R - EN3155-052 and EN3155-053.

6. Miscellaneous Normal Contacts (Ref. 20-48-25)
   - E0078
   - E0252
   - E0367
   - NSA932829
   - NSA932833
   - NSA937910
   - NSA938190 and NSA938191.

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CONTACTS	USE WITH		ATA REF
	PLUG	RECEPTACLE	
E0380	E0237	E0237	
E0395	ABS0713-E0237-E0302 E0362-E0390-E0684-E0756 NSA938026-NSA938027 NSA938361	ABS0713-E0237-E0302 E0362-E0390-E0734 NSA938028-NSA938361	
E0396	ABS0713-E0237-E0302 E0362-E0390-E0417-E0658 E0684-E0756-NSA938026 NSA938027-NSA938361	058-014-00 ABS0713-E0237-E0302 E0362-E0390-E0734 NSA938028-NSA938361	
E0397	E0237-E0362-E0390 NSA938026-NSA938027 NSA938361	E0237-E0362-E0390 NSA938028 NSA938361	
NSA938151 NSA938152 EN3155-018 EN3155-019	EN2997-EN3646 ABS0364-ABS497-E0039 E0052-E0186-E0195-E0320 E0451-E0452-E0579 NSA933668-NSA933669 NSA938000 SOURIAU 8915-61	EN2997-EN3646 ABS0364-ABS0498-E0040 E0041-E0053-E0054-E0187 E0197-E0321-E0322-E0434 NSA938001-NSA938002	20-48-21
NSA938193 NSA938194	E0362-E0390-E0684-E0756 NSA938026-NSA938027 NSA938361	E0362-E0390-E0734 NSA938028-NSA938361	
NSA938402	E0362-NSA938361	E0362-NSA938361	
NSA938403	E0083-E0086-E0087-E0097 E0122-E0145-E237 E0302-E0390 NSA938310-NSA938323 NSA938325-NSA938331 NSA938332-NSA938341 NSA938346-NSA938355	E0083-E0087-E0097 E0147-E0237 E0302-E0390 NSA938310-NSA938323 NSA938325-NSA938341 NSA938346-NSA938355	
NSA938195	E0052	E0053-E0054	
ABS0832	ABS0831	-	20-48-22
E0170 E0171	E0161-E0163 E0165	-	

SIS 20 48 20 0 AAMO 10

R

Normal Contacts - Connection Table
Figure 001

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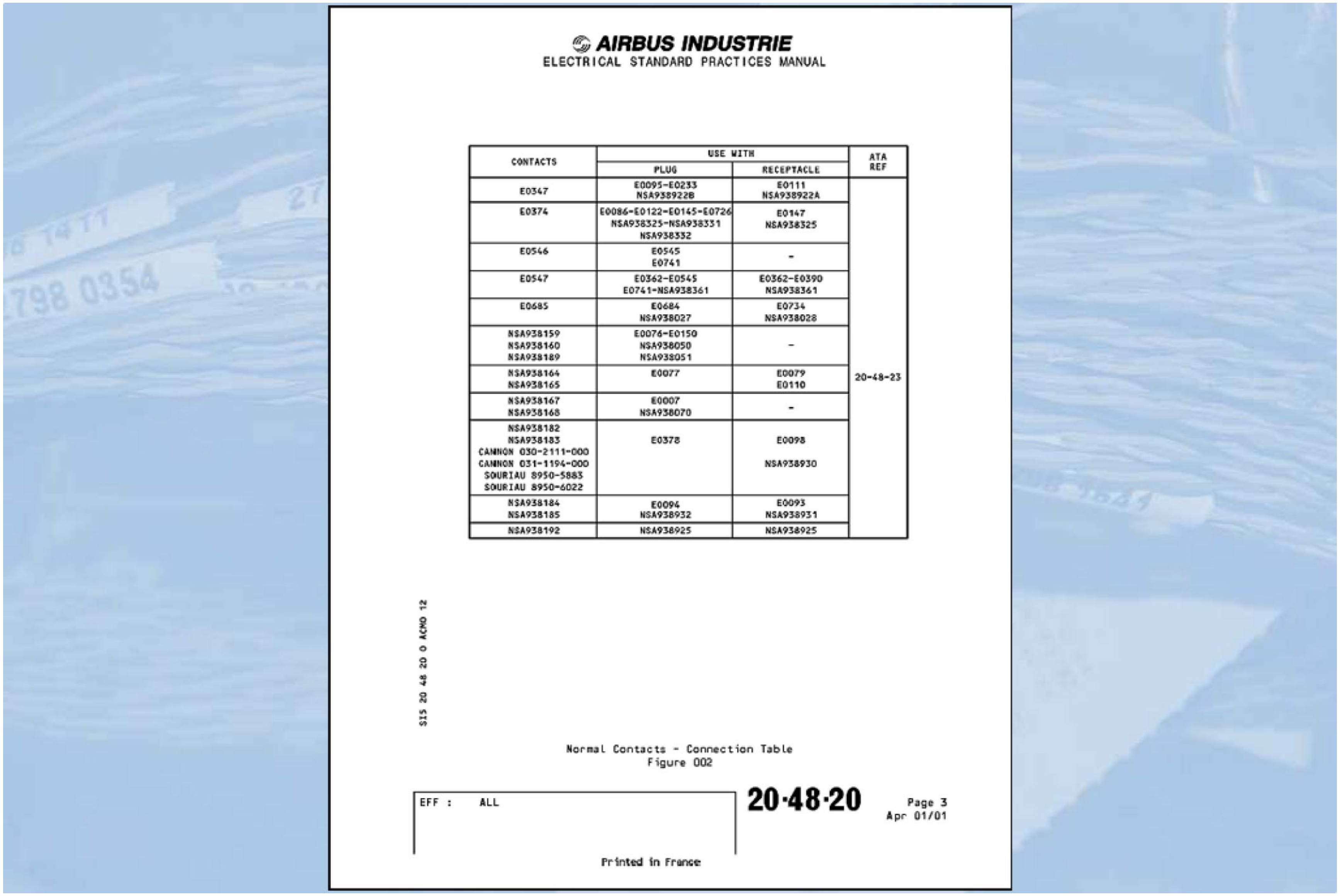

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

CONTACTS	USE WITH		ATA REF
	PLUG	RECEPTACLE	
E0347	E0095-E0233 NSA938922B	E0111 NSA938922A	20-48-23
E0374	E0086-E0122-E0145-E0726 NSA938325-NSA938331 NSA938332	E0147 NSA938325	
E0546	E0545 E0741	-	
E0547	E0362-E0545 E0741-NSA938361	E0362-E0390 NSA938361	
E0685	E0684 NSA938027	E0734 NSA938028	
NSA938159 NSA938160 NSA938189	E0076-E0150 NSA938050 NSA938051	-	
NSA938164 NSA938165	E0077	E0079 E0110	
NSA938167 NSA938168	E0007 NSA938070	-	
NSA938182 NSA938183 CANNON 030-2111-000 CANNON 031-1194-000 SOURIAU 8950-5883 SOURIAU 8950-6022	E0378	E0098 NSA938930	
NSA938184 NSA938185	E0094 NSA938932	E0093 NSA938931	
NSA938192	NSA938925	NSA938925	

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Normal Contacts - Connection Table
Figure 002

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ELECTRICAL STANDARD PRACTICES MANUAL

CONTACTS	USE WITH		ATA REF
	PLUG	RECEPTACLE	
E0445 E0446 EN3155-004 EN3155-005	E0441-E0442 EN2997	E0444-EN2997	20-48-24
EN3155-003	EN3545	-	
EN3155-008	-	EN3545	
EN3155-014	-	EN3545	
EN3155-015	EN3545	-	
EN3155-016	STANDARD ELEMENTS LEGS, CIRCUIT BREAKERS, AUXILIARY CONTACTS, READING LIGHTS	E0439-E0682 NSA933661 NSA933687 NSA933688 NSA937901M/MA	
EN3155-017	E0219-E0247-E0249 E0250-E0251-E0311 E0673-E0745-E0746 EN2593	-	
EN3155-052 EN3155-053	EN6047-004	EN6047-003	
E0078	NSA932844 NSA932847	NSA932805	20-48-25
E0252	E0219-E0247-E0249 E0250-E0251-E0311 E0673-E0745-E0746	-	
E0367	E0366	-	
NSA932829	NSA932829	-	
NSA938190 NSA938191	NSA938019	NSA938018	
NSA938833	NSA932833	-	
NSA937910	STANDARD ELEMENTS LEGS, CIRCUIT BREAKERS, AUXILIARY CONTACTS, READING LIGHTS	E0439-E0682 NSA933661 NSA933687 NSA933688 NSA937901M/MA	

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Normal Contacts - Connection Table
Figure 003

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ELECTRICAL STANDARD PRACTICES MANUAL

NORMAL CONTACTS FOR PREN CONNECTORS - DESCRIPTION AND OPERATION

1. General

This chapter gives the connection procedure for Normal Contacts used for PREN type Connectors. These contacts have the codes that follow:

- E0445, E0446, EN3155-004 and EN3155-005
- EN3155-003, EN3155-008, EN3155-014 and EN3155-015
- EN3155-016
- EN3155-017
- EN3155-052 and EN3155-053.

2. Connection Procedure for Contacts E0445, E0446, EN3155-004 and EN3155-005

A. Contact P/N and Characteristics
(Ref. Fig. 001)

CONTACT	USE WITH	
	PLUG	RECEPTACLE
E0445	E0441	
E0446	E0442	E0444
EN3155-004	EN2997	EN2997
EN3155-005		

B. Temperature

Minimum operating temperature is -65 deg.C (-85.00 deg.F).
Maximum operating temperature is 260 deg.C (500.00 deg.F).

C. Contact Insertion/Extraction Tools
(Ref. Fig. 002)

D. Wire Stripping

(1) Normal wires

(Ref. Fig. 003, 004, 005)

- If necessary install the heat shrinkable sleeve on the wire before stripping.
  Shrinking is done after crimping.
- Use the applicable tool.
- Strip the wire to the length "A".

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ELECTRICAL STANDARD PRACTICES MANUAL

4. Connection Procedure for Contacts EN3155-016

A. Contacts P/N and Characteristics
R (Ref. Fig. 011)

CONTACTS	USE WITH	
	PLUG	RECEPTACLE
EN3155-016	Standard element legs, Circuit Breakers, Auxiliary Contacts, Reading lights	NSA933661, NSA933687 NSA933688 NSA937910M/MA E0439 - E0682

B. Sealing
R (Ref. Fig. 012)
Sealing is necessary depending the area and the wire gauge.
- Refer to the sealing sleeve allocation table. It gives you the shrinkable sleeve (P/N and size) to use for sealing.
- Install the heat - shrinkable sleeve on the wire before stripping. Shrinking is made after crimping. For standard element legs install the sleeve NSA937201 or NSA937212, leave on part of the leg uncovered to permit crimping of the contact and cut it to lenght.

NOTE : After the sealing sleeve, do not forget the install the identification sleeve on one of the standard element leg.

C. Wire stripping
R (Ref. Fig. 013)
- Select the applicable tool.
- Strip the wire to the lenght "A".

D. Crimping Procedure and Tools
R (Ref. Fig. 014)
- Select the applicable tool.
- Engage the stripped wire or the standard element leg in the contact.
- Make sure that you can see the wire conductor or the standard element leg throught the contact inspection hole.
- Install the contact in the positionner.
- Fully close the tool handles until the safety ratchet releases.
- Remove the crimped contact.
- If sealing is necessary:
  -Slide the sleeve near the contact rear.
  -Heat shrink the sleeve.

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X8U08481 - X0332T0 - XM2037000000001

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PIN: EN3155-016MXXXX

CONTACT			INSERTION/EXTRACTION TOOLS			
PIN	SIZE	CHARACTERISTICS	UTILIZATION	NORM	P/N	COLOR
M2222	22	WIRED	INS/EXT	MIL	22520/14-01	GREEN/WHITE
			INSERTION	DANIELS	DAK 9522M	-
				ASTRO	ATBX 1054	-
			EXTRACTION	DANIELS	DRK 9522M	-
				ASTRO	ATBX 2050	-
M2018	20	WIRED	INS/EXT	MIL	22520/14-11	RED/WHITE
			INSERTION	ASTRO	ATR 1080S	-
			EXTRACTION		ATR 2080S	-
		UNWIRED	EXTRACTION	SOURIAU	8522-56	-
				CANNON	CET 20-24	-
M1616	16	WIRED	INS/EXT	MIL	22520/14-03	BLUE/WHITE
		UNWIRED	EXTRACTION	SOURIAU	8522-57	-
				CANNON	CET 16-21	-
M1212	12	WIRED	INS/EXT	MIL	2252/14-04	YELLOW/WHITE
		UNWIRED	EXTRACTION	SOURIAU	8522-58	-
				CANNON	CET 12-16	-

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Normal Contacts - P/N Characteristics and Ins/Ext Tools
EN3155-016
Figure 011

R

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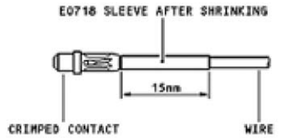
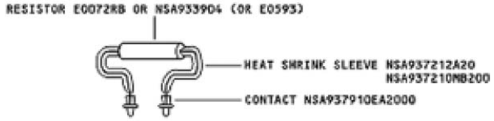
ELECTRICAL STANDARD PRACTICES MANUAL



WIRE		CONTACT SIZE				SHRINKABLE SLEEVE E0718-XX-XX	SHRINKING TOOL	
TYPE	SIZE	22	20	16	12		NORM	P/N
BF	24		X			01-15	RAYCHEM	CV 1981-42V-960W + HEAD PR 13
	20			X		01-15		
	18			X		01-15		
CF	26	X				20-15		
	24		X			20-15		
	22		X			01-15		
	20			X		01-15		
	18			X		01-15		
	16			X		02-15		
	14				X	02-15		

SIS 20 48 24 0 BRMO 02



Normal Contacts - Shrinking Characteristics
EN3155-016
Figure 012

R

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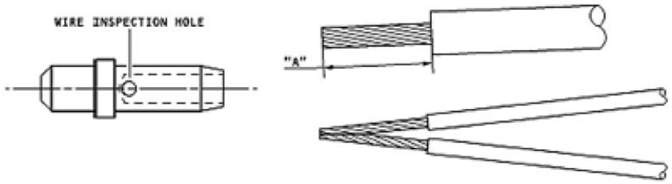
ELECTRICAL STANDARD PRACTICES MANUAL



PIN:EN3155-016MXXXX

CONTACT		ADMISSIBLE WIRE GAUGE	STRIPPING			
			LENGTH "A" (mm)	TOOL		
PIN	SIZE			NORM	P/N	COLOR
M2222	22	26, 24, 22	4	STRIPMASTER	45-2020-1	BLUE
M2018	20	24, 22, 20, 18	4.5			
		2 x 24	4.8			
M1616	16	20, 18, 16	7			
M1212	12	14, 12	7		45-1939-1	RED

SIS 20 48 24 0 BUMO 01

Normal Contacts - Stripping Characteristics and Tools
EN3155-016
Figure 013

R

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ELECTRICAL STANDARD PRACTICES MANUAL

PIN: EN3155-016MXXXX

CONTACT	WIRE GAUGE	CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTION POSITION
		NORM	P/N	NORM	P/N	COLOR	
M2222	26	MIL	22520/2-01	DANIELS	K127-2	-	2
			22520/7-01		86-88		
	24		22520/2-01		K127-2		2
			22520/7-01		86-88		3
	22		22520/2-01		K127-2		3
			22520/7-01		86-88		4
M2018	24	MIL	22520/2-01	MIL	22520/2-02	-	5
			22520/7-01		22520/7-02		4
	2x24		22520/2-01		22520/2-02		6
			22520/7-01		22520/7-02		5
	22		22520/2-01		22520/2-02		6
			22520/7-01		22520/7-02		5
	20		22520/2-01		22520/2-02		7
			22520/7-01		22520/7-02		6
	18		22520/2-01		22520/2-02		8
			22520/7-01		22520/7-02		7
M1616	20	MIL	22520/1-01	MIL	22520/1-02	BLUE	4
			22520/7-01		22520/7-03	-	5
	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	6
	16		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
M1212	14	MIL	22520/1-01	MIL	22520/1-02	-	7
	12						8

PIN: EN3155-016M2018

STANDARD ELEMENT		CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTION POSITION
LEG ø (mm)	P/N	NORM	P/N	NORM	P/N	COLOR	
0.5	NSA934113	MIL	22520/2-01	MIL	22520/2-02	-	5
			22520/7-01		22520/7-02		6
0.6	NSA934114 NSA933904 NSA933905		22520/2-01		22520/2-02		5
			22520/7-01		22520/7-02		6
0.8	E0072		22520/2-01		22520/2-02		6
			22520/7-01		22520/7-02		7

SIS 20 48 24 0 BXMO 01

Normal Contacts - Crimping Tools
EN3155-016
Figure 014

R

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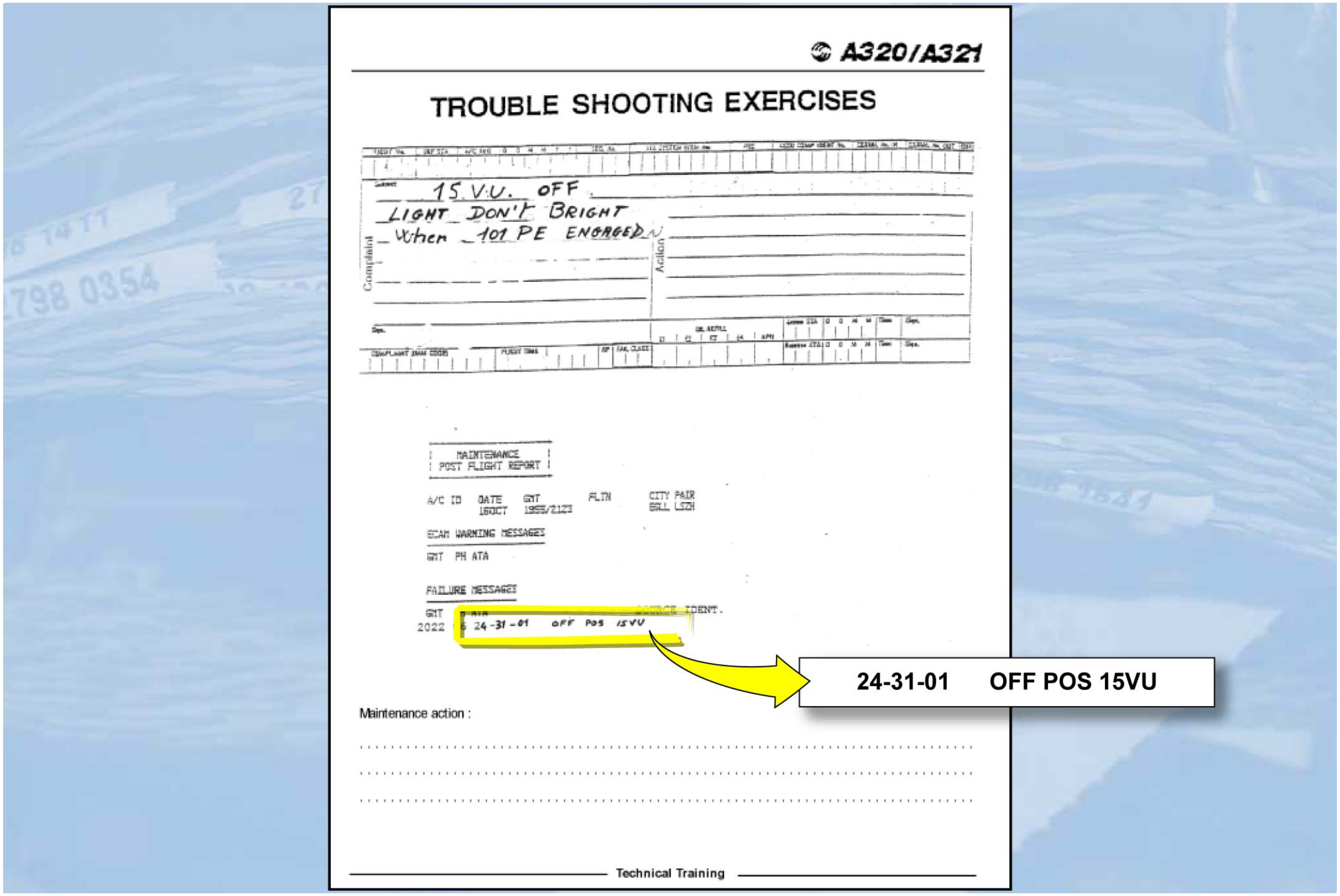
TSM

PANEL 15 VU



A320/A321

TROUBLE SHOOTING EXERCISES

Complaint: 15 V.U. OFF LIGHT DON'T BRIGHT When 101 PE ENGAGED

Action

MAINTENANCE POST FLIGHT REPORT

A/C ID DATE GMT FLTN CITY PAIR
16OCT 1955/2123 EGLL LSZH

ECAM WARNING MESSAGES
GMT PH ATA

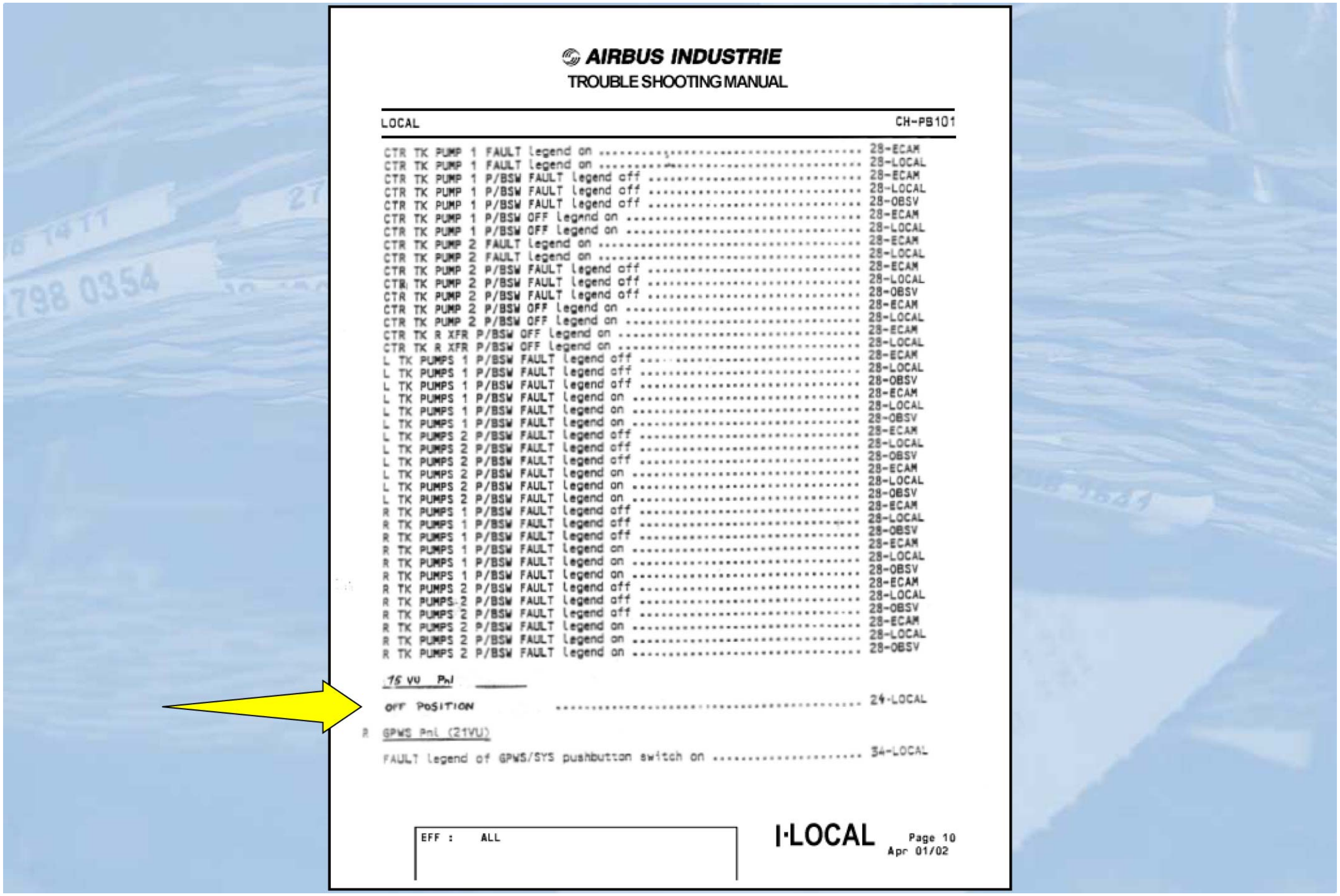
FAILURE MESSAGES
GMT PH ATA SOURCE IDENT.
2022 6 24-31-01 OFF POS 15VU

Maintenance action :

Technical Training

PANEL 15 VU

X8U08481 - X0332T0 - XM2037000000001



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TROUBLE SHOOTING MANUAL

LOCAL CH-PB101

CTR TK PUMP 1 FAULT legend on	28-ECAM
CTR TK PUMP 1 FAULT legend on	28-LOCAL
CTR TK PUMP 1 P/BSW FAULT legend off	28-ECAM
CTR TK PUMP 1 P/BSW FAULT legend off	28-LOCAL
CTR TK PUMP 1 P/BSW FAULT legend off	28-OBSV
CTR TK PUMP 1 P/BSW OFF legend on	28-ECAM
CTR TK PUMP 1 P/BSW OFF legend on	28-LOCAL
CTR TK PUMP 2 FAULT legend on	28-ECAM
CTR TK PUMP 2 FAULT legend on	28-LOCAL
CTR TK PUMP 2 P/BSW FAULT legend off	28-ECAM
CTR TK PUMP 2 P/BSW FAULT legend off	28-LOCAL
CTR TK PUMP 2 P/BSW FAULT legend off	28-OBSV
CTR TK PUMP 2 P/BSW OFF legend on	28-ECAM
CTR TK PUMP 2 P/BSW OFF legend on	28-LOCAL
CTR TK R XFR P/BSW OFF legend on	28-ECAM
CTR TK R XFR P/BSW OFF legend on	28-LOCAL
L TK PUMPS 1 P/BSW FAULT legend off	28-ECAM
L TK PUMPS 1 P/BSW FAULT legend off	28-LOCAL
L TK PUMPS 1 P/BSW FAULT legend off	28-OBSV
L TK PUMPS 1 P/BSW FAULT legend on	28-ECAM
L TK PUMPS 1 P/BSW FAULT legend on	28-LOCAL
L TK PUMPS 1 P/BSW FAULT legend on	28-OBSV
L TK PUMPS 2 P/BSW FAULT legend off	28-ECAM
L TK PUMPS 2 P/BSW FAULT legend off	28-LOCAL
L TK PUMPS 2 P/BSW FAULT legend off	28-OBSV
L TK PUMPS 2 P/BSW FAULT legend on	28-ECAM
L TK PUMPS 2 P/BSW FAULT legend on	28-LOCAL
L TK PUMPS 2 P/BSW FAULT legend on	28-OBSV
R TK PUMPS 1 P/BSW FAULT legend off	28-ECAM
R TK PUMPS 1 P/BSW FAULT legend off	28-LOCAL
R TK PUMPS 1 P/BSW FAULT legend off	28-OBSV
R TK PUMPS 1 P/BSW FAULT legend on	28-ECAM
R TK PUMPS 1 P/BSW FAULT legend on	28-LOCAL
R TK PUMPS 1 P/BSW FAULT legend on	28-OBSV
R TK PUMPS 2 P/BSW FAULT legend off	28-ECAM
R TK PUMPS 2 P/BSW FAULT legend off	28-LOCAL
R TK PUMPS 2 P/BSW FAULT legend off	28-OBSV
R TK PUMPS 2 P/BSW FAULT legend on	28-ECAM
R TK PUMPS 2 P/BSW FAULT legend on	28-LOCAL
R TK PUMPS 2 P/BSW FAULT legend on	28-OBSV

15 VU Pnl

OFF POSITION	24-LOCAL

R GPWS Pnl (21VU)

FAULT legend of GPWS/SYS pushbutton switch on	34-LOCAL

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PANEL 15 VU

A319/A320/A321
TROUBLE SHOOTING MANUAL

COMMUNICATIONS - FAULT SYMPTOMS

	WARNINGS/MALFUNCTIONS	CFDS FAULT MESSAGES				FAULT ISOLATION PROCEDURE
		SOURCE	MESSAGE	ATA	C	
	FWD ATTND Pnl (Z221)					
R	CIDS CAUT LT CAUT LT on	CIDS 1	CAM	237319	1	237300 PA210 T 810 857
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS MID BUS L	237300	1	237300 P 291 T 810 836
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS MID BUS R	237300	1	237300 P 297 T 810 837
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS TOP BUS 1 L	237300	1	237300 P 267 T 810 832
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS TOP BUS 1 R	237300	1	237300 P 279 T 810 834
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS TOP BUS 2 L	237300	1	237300 P 273 T 810 833
	CIDS CAUT LT CAUT LT on	CIDS 1	CIDS TOP BUS 2 R	237300	1	237300 P 285 T 810 835
	CIDS CAUT LT CAUT LT on	CIDS 1	DRAINMAST HEATER AFT	307151	1	307100 P 203 T 810 802
	CIDS CAUT LT CAUT LT on	CIDS 1	DRAINMAST HEATER FWD	307151	1	307100 P 201 T 810 801
	CIDS CAUT LT CAUT LT on	CIDS 1	DRAINMAST UNIT AFT	307134	1	307100 P 207 T 810 804
	CIDS CAUT LT CAUT LT on	CIDS 1	DRAINMAST UNIT FWD	307134	1	307100 P 205 T 810 803
R	CIDS CAUT LT CAUT LT on	CIDS 1	FWD ATTND PNL	237312	1	237300 PA203 T 810 838
	CIDS CAUT LT CAUT LT on	CIDS 1	NO CAM DATA	237319	1	237300 PA218 T 810 860

EFF : ALL

23·LOCAL Page 101
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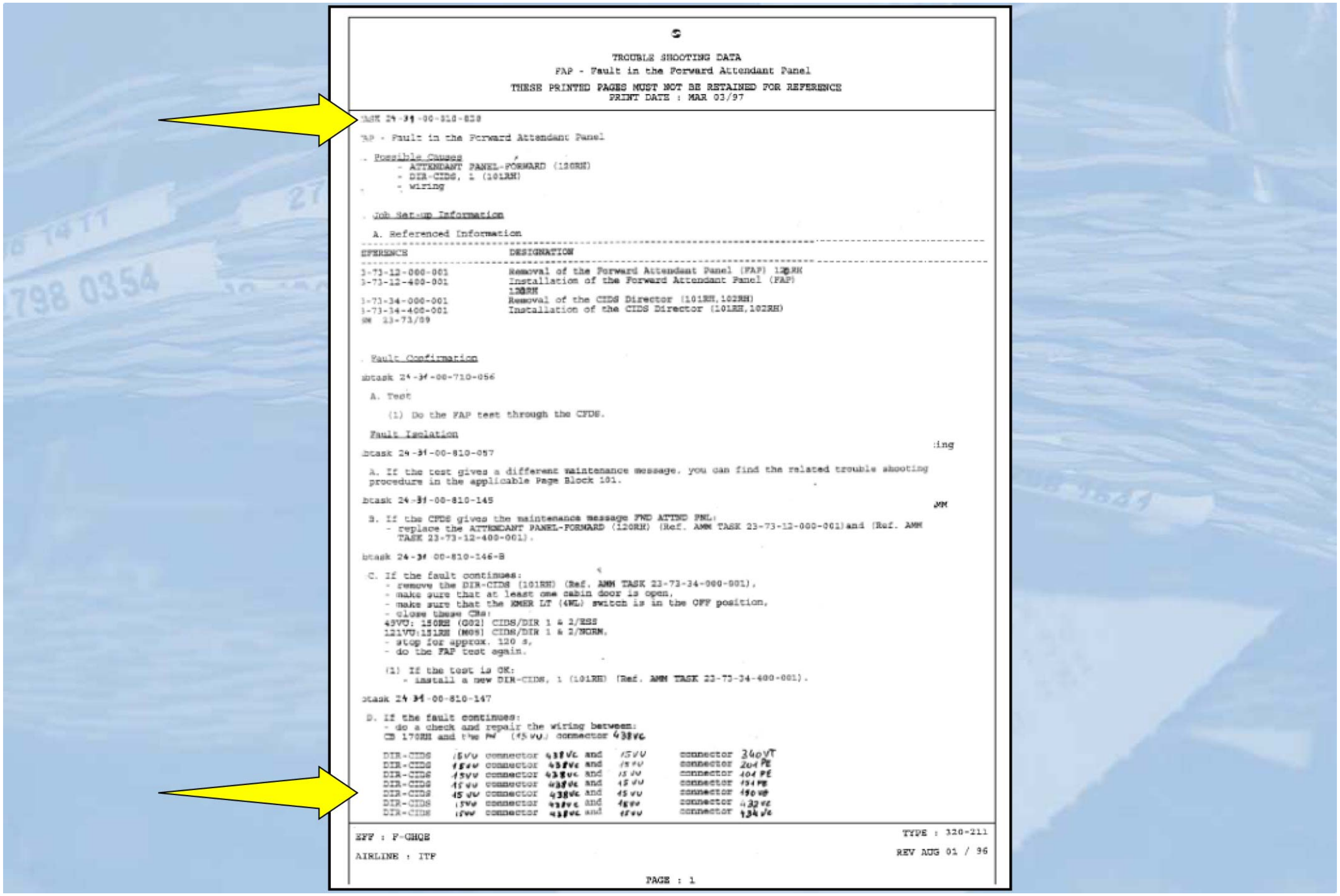
PANEL 15 VU



TROUBLE SHOOTING DATA

FAP - Fault in the Forward Attendant Panel

THESE PRINTED PAGES MUST NOT BE RETAINED FOR REFERENCE
PRINT DATE : MAR 03/97

TASK 24-34-00-810-828

FAP - Fault in the Forward Attendant Panel

. Possible Causes
- ATTENDANT PANEL-FORWARD (120RH)
- DIR-CIDS, 1 (101RH)
- wiring

. Job Set-up Information

A. Referenced Information

REFERENCE	DESIGNATION
3-73-12-000-001	Removal of the Forward Attendant Panel (FAP) 120RH
3-73-12-400-001	Installation of the Forward Attendant Panel (FAP) 120RH
3-73-34-000-001	Removal of the CIDS Director (101RH,102RH)
3-73-34-400-001	Installation of the CIDS Director (101RH,102RH)
SM 23-73/09	

. Fault Confirmation

Subtask 24-34-00-710-056

A. Test

(1) Do the FAP test through the CFDS.

Fault Isolation

Subtask 24-34-00-810-057

A. If the test gives a different maintenance message, you can find the related trouble shooting procedure in the applicable Page Block 101.

Subtask 24-34-00-810-145

B. If the CFDS gives the maintenance message FWD ATTND PNL:
- replace the ATTENDANT PANEL-FORWARD (120RH) (Ref. AMM TASK 23-73-12-000-001) and (Ref. AMM TASK 23-73-12-400-001).

Subtask 24-34-00-810-146-B

C. If the fault continues:
- remove the DIR-CIDS (101RH) (Ref. AMM TASK 23-73-34-000-001),
- make sure that at least one cabin door is open,
- make sure that the EMER LT (4WL) switch is in the OFF position,
- close these CBs:
49VU: 150RH (G02) CIDS/DIR 1 & 2/ESS
121VU:151RH (M05) CIDS/DIR 1 & 2/NORM,
- stop for approx. 120 s,
- do the FAP test again.

(1) If the test is OK:
- install a new DIR-CIDS, 1 (101RH) (Ref. AMM TASK 23-73-34-400-001).

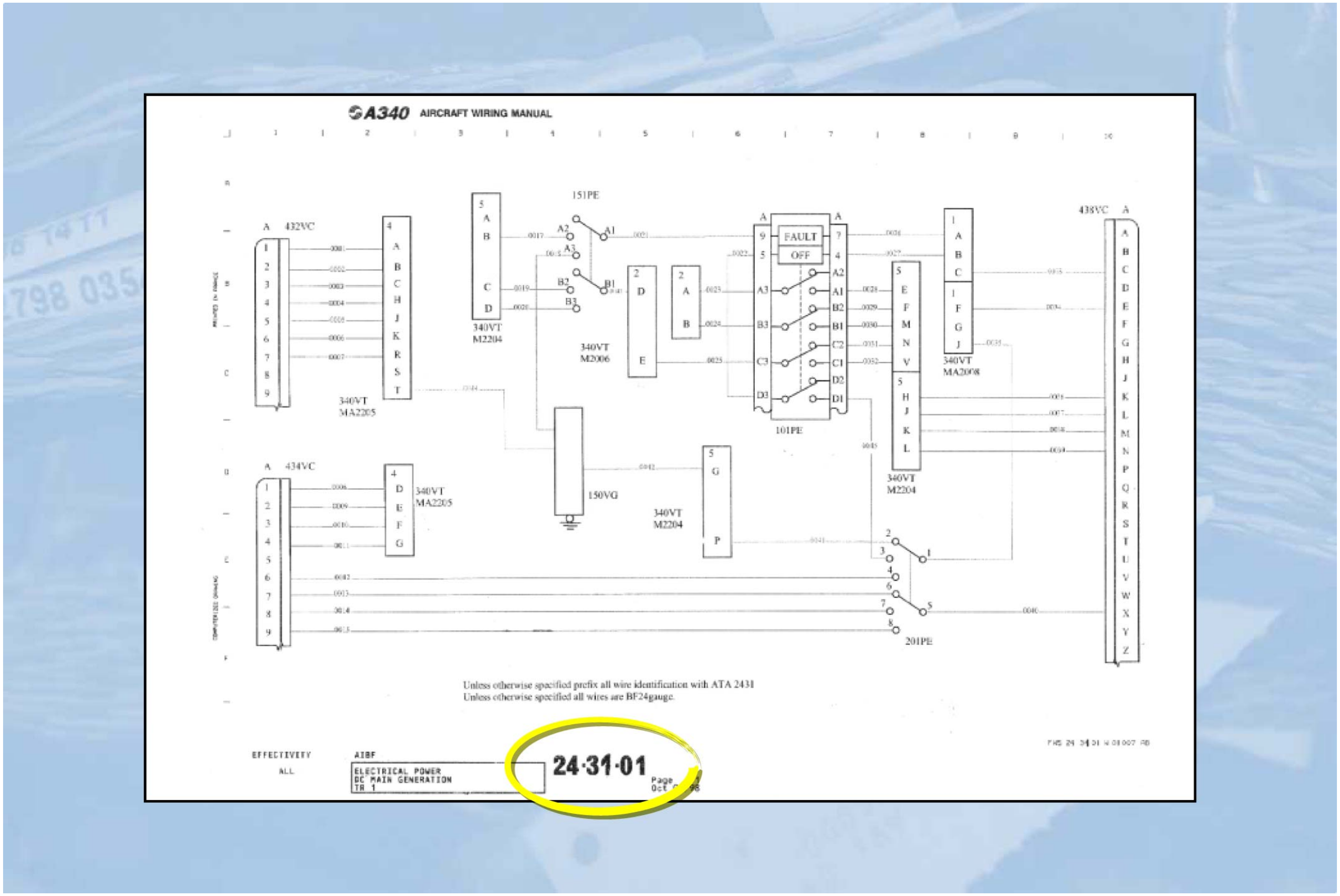
Subtask 24-34-00-810-147

D. If the fault continues:
- do a check and repair the wiring between:
CB 170RH and the FW (15 VU) connector 438VC

DIR-CIDS 15VU connector 438VC and 15VU connector 340VT
DIR-CIDS 15VU connector 438VC and 15VU connector 204PE
DIR-CIDS 15VU connector 438VC and 15VU connector 404PE
DIR-CIDS 15VU connector 438VC and 15VU connector 454PE
DIR-CIDS 15VU connector 438VC and 15VU connector 450VP
DIR-CIDS 15VU connector 438VC and 15VU connector 432VC
DIR-CIDS 15VU connector 438VC and 15VU connector 434VC

EFF : F-GHQE
AIRLINE : ITF
TYPE : 320-211
REV AUG 01 / 96
PAGE : 1

PANEL 15 VU


A340 AIRCRAFT WIRING MANUAL
151PE
432VC
434VC
438VC
FAULT
OFF
101PE
150VG
201PE
340VT M2204
340VT M2006
340VT MA2205
340VT MA2008
Unless otherwise specified prefix all wire identification with ATA 2431
Unless otherwise specified all wires are BF24gauge.
EFFECTIVITY
ALL
A1BF
ELECTRICAL POWER
DC MAIN GENERATION
TR 1
24-31-01

PANEL 15 VU

PANEL 15 VU

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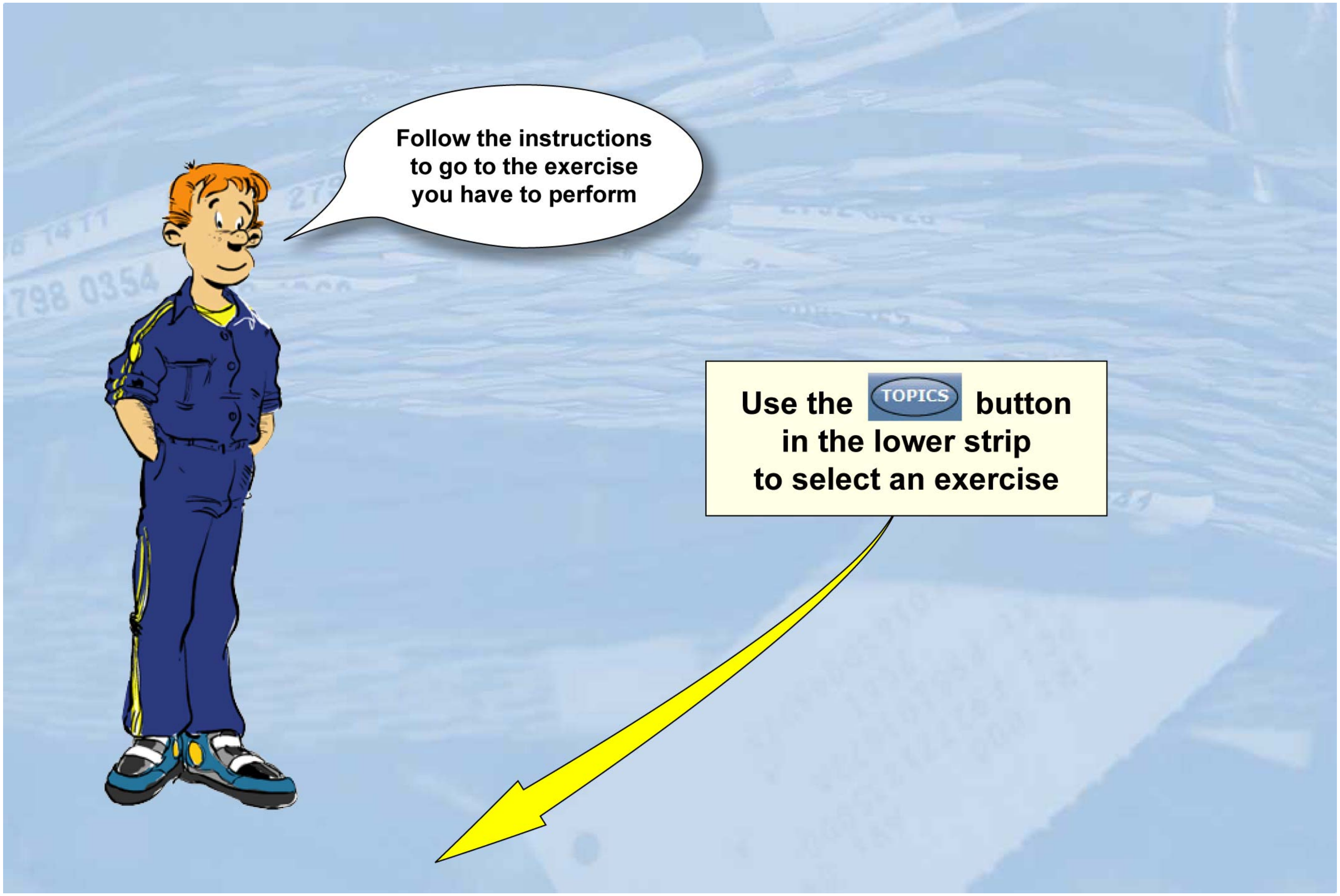
CONNECTORS

VIEWING INSTRUCTIONS

Follow the instructions to go to the exercise you have to perform.

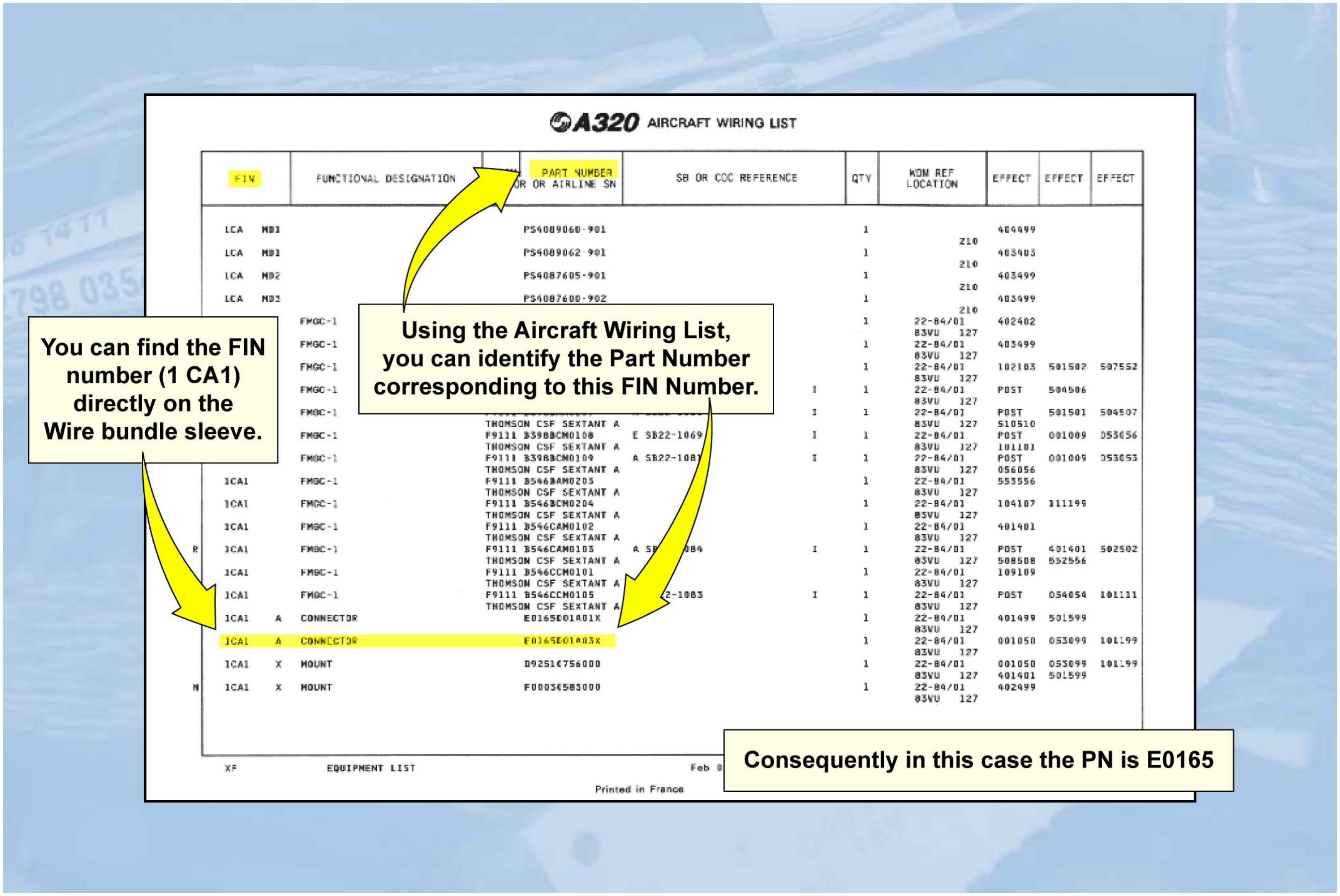


VIEWING INSTRUCTIONS

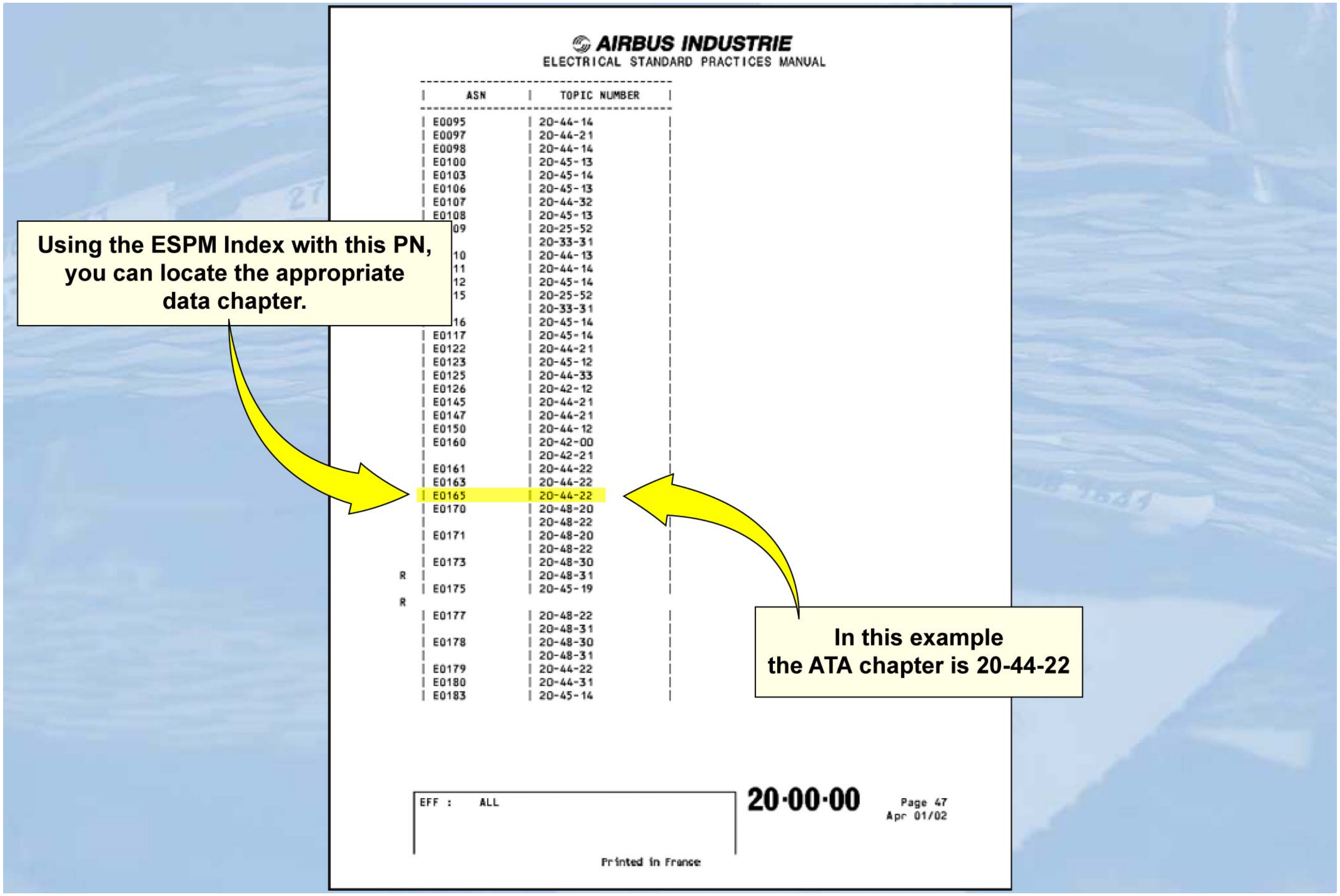
CONNECTORS

E0165

You can find the FIN number (1 CA1) directly on the Wire bundle sleeve.
Using the Aircraft Wiring List, you can identify the Part Number corresponding to this FIN Number.
Consequently in this case the PN is E0165
In this example the ATA chapter is 20-44-22
Using the ESPM Index with this PN, you can locate the appropriate data chapter.
Here, by turning the pages, you can find all the information you require.


A320 AIRCRAFT WIRING LIST
You can find the FIN number (1 CA1) directly on the Wire bundle sleeve.
Using the Aircraft Wiring List, you can identify the Part Number corresponding to this FIN Number.
Consequently in this case the PN is E0165

E0165



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

	ASN	TOPIC NUMBER
	E0095	20-44-14
	E0097	20-44-21
	E0098	20-44-14
	E0100	20-45-13
	E0103	20-45-14
	E0106	20-45-13
	E0107	20-44-32
	E0108	20-45-13
	09	20-25-52
		20-33-31
	10	20-44-13
	11	20-44-14
	12	20-45-14
	15	20-25-52
		20-33-31
	16	20-45-14
	E0117	20-45-14
	E0122	20-44-21
	E0123	20-45-12
	E0125	20-44-33
	E0126	20-42-12
	E0145	20-44-21
	E0147	20-44-21
	E0150	20-44-12
	E0160	20-42-00
		20-42-21
	E0161	20-44-22
	E0163	20-44-22
	E0165	20-44-22
	E0170	20-48-20
		20-48-22
	E0171	20-48-20
		20-48-22
	E0173	20-48-30
R		20-48-31
	E0175	20-45-19
R		
	E0177	20-48-22
		20-48-31
	E0178	20-48-30
		20-48-31
	E0179	20-44-22
	E0180	20-44-31
	E0183	20-45-14

EFF : ALL

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E0165

X8U08481 - X0332T0 - XM2038000000001

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ELECTRICAL STANDARD PRACTICES MANUAL

CONNECTORS TYPE ARINC600 - DESCRIPTION AND OPERATION

1. General
   Connectors of the ARINC 600 type installed on aircraft have the codes that follow :
   - ABS0831 connector with grounding contacts.
   - E0161 plug size 1 associated with E0162 receptacle size 1.
   - E0163 plug size 2 associated with E0164 receptacle size 2.
   - E0165 plug size 3.
   - E0179 insert for ARINC 600 connectors.

2. ABS0831 Connector

   A. P/N Identification

   (1) For complete connector:

```
ABS0831  D  G  01A  91   XX
   |     |  |   |    |    |
   |     |  |   |    |     ------ Variant code
   |     |  |   |     ------------ Polarization code
   |     |  |    ----------------- Contact configuration code
   |     |   -------------------- Connector type code | G = Unsealed with
   |     |                                            |     ground contacts
   |     |                                            | H = Sealed with
   |     |                                            |     ground contacts
   |     |
   |     |                                             | A = E0161
   |      ------------------------ Basic connector code | C = E0163
   |                                                   | D = E0165
    ------------------------------ Standard P/N
```

   (2) For components:

```
ABS0831  MK  01
   |     |    |
   |     |     ---------- Version code
   |      --------------- Component type code | MK = Polarization key, male
   |                                          | RP = Retention plate
   |                                          | FK = Polarization key, female
   |                                          | BB = Fixing screws for signal
   |                                          |      retention plate
   |                                          | WW = Spring washers for fixing
   |                                          |      screws
    -------------------- Standard P/N
```

EFF : ALL

R

20-44-22

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ELECTRICAL STANDARD PRACTICES MANUAL

B. P/N characteristics

(1) Variant code
No code : Delivery with signal contacts and ground contacts
X : Delivery only with ground contacts

(2) Polarization system
(Ref. Fig. 001, 002)

(3) Polarization setting
- Remove the two screws that attach the key retention plate.
- Put the polarization keys in the correct position for connector coding (refer to the polarization table).
- Put the key retention plate in position.
- Install the two screws that attach the key retention plate.
- TORQUE the two screws to between 0.02 m.daN (1.7699 lbf.in) and 0.04 m.daN (3.5398 lbf.in) with a torque screwdriver.

C. Connector configuration
(Ref. Fig. 003, 004)

D. Contact configuration
Refer E0179 insert.

EFF : ALL
R
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E0165

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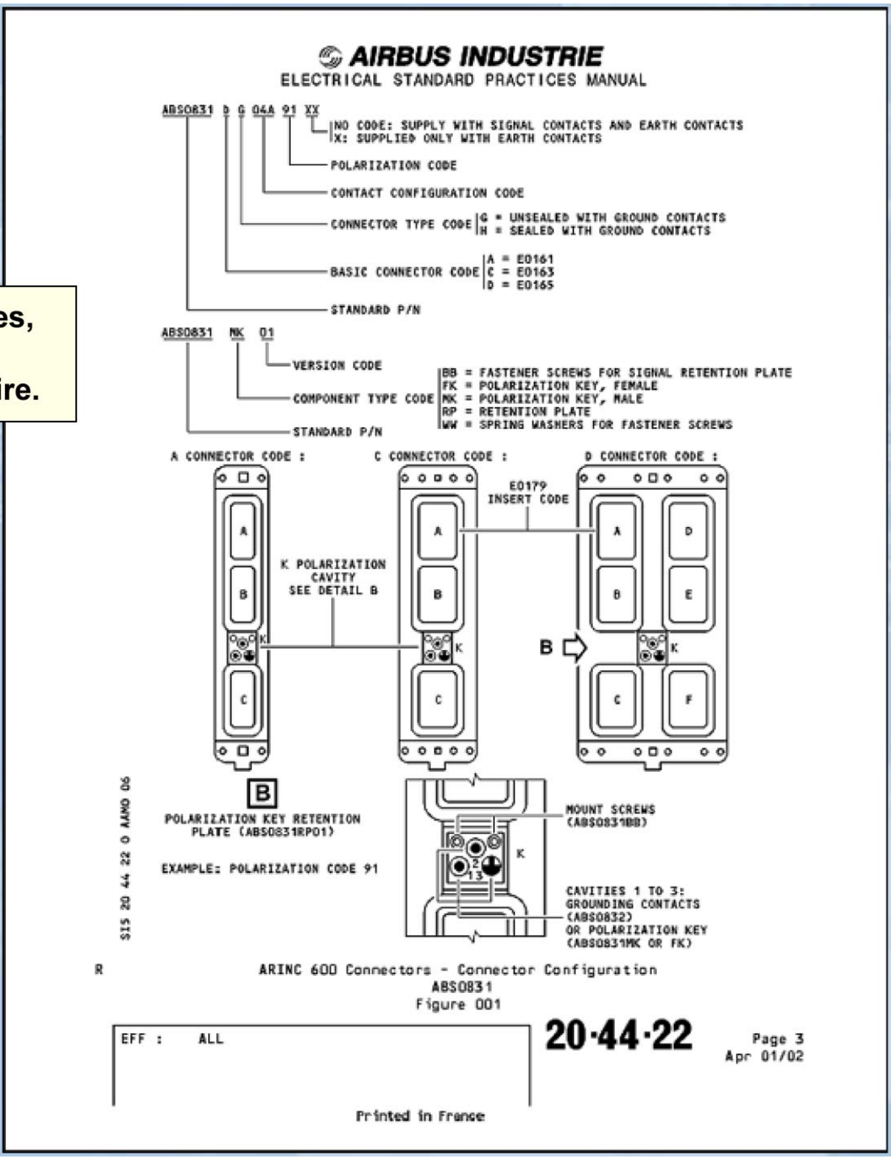

E0165

X8U08481 - X0332T0 - XM2038000000001

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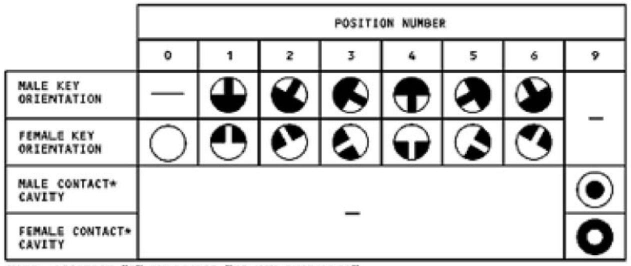
ELECTRICAL STANDARD PRACTICES MANUAL

POLARIZATION KEYS POSITIONS

POLARIZATION CODE	PLUG (RACK) WITH MALE KEY OR CONTACTS – CAVITY NO 1	2	3	RECEPTACLE (EQUIPMENT) WITH FEMALE KEY OR CONTACTS – CAVITY NO 1	2	3
91	9	9	1	1	9	9
92	9	9	2	2	9	9
93	9	9	3	3	9	9
94	9	9	4	4	9	9
95	9	9	5	5	9	9
96	9	9	6	6	9	9
19	1	9	9	9	9	1
29	2	9	9	9	9	2
39	3	9	9	9	9	3
49	4	9	9	9	9	4
59	5	9	9	9	9	5
69	6	9	9	9	9	6
10	9	9	1	0	9	9
40	9	9	4	0	9	9

NOTE: DARK AREA REPRESENTS THE EXTENDED PART OF THE POLARIZATION DEVICE (MALE OR FEMALE)



NOTE: POSITION "0" INDICATES "NO KEY INSTALLED".
* FOR MALE CONTACT REFER TO ABS0832KK, FOR FEMALE CONTACT REFER TO ABS0832LK

SIS 20 44 22 0 APMO 02

R

ARINC 600 Connectors - Polarization System
ABS0831
Figure 002

EFF : ALL

20-44-22

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FOR ABS0831 CODE A AND E0161

CONNECTOR SIZE	CONTACT CONFIGURATION CODE	INSERT E0179-XX X SIZE CODE INSERT A	INSERT B	INSERT C
1	00	NO INSERT		
	01A	01	01	05

FOR ABS0831 CODE D AND E0165

CONNECTOR SIZE	CONTACT CONFIGURATION CODE	INSERT E0179-XX X SIZE CODE INSERT A	INSERT B	INSERT C	INSERT D	INSERT E	INSERT F
3	00	NO INSERT					
	01A	07	07	15	07	07	15
	02A	07	07	13	07	07	15
	03A	07	07	17	07	07	17
	04A	07	07	13	07	07	13
	05A	25	25	15	EMPTY CAVITY	07	13

SIS 20 44 22 0 ACMO 03

R ARINC 600 Connectors - Contact Configurations & Insert Size Codes
R ABS0831, E0161 and E0165
R Figure 003

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ELECTRICAL STANDARD PRACTICES MANUAL

FOR ABS0831 CODE C AND E0163

CONNECTOR SIZE	CONTACT CONFIGURATION CODE	INSERT E0179-XX		
		INSERT A	INSERT B	INSERT C
2	00	-	-	-
	01	07	07	15
	02C	07	11	15
	03	11	11	15
	04	RADAR RECEIVER	07	15
	05	07	07	13
	06	19	27	17
	07	07	23	15
	08	27	11	15
	09	07	19	15
	10	25	07	15
	11	07	21	15
	12	25	29	15
	13	27	07	15

SIS 20 44 22 0 AEMO 03

R ARINC 600 Connectors - Contact Configurations & Insert Size Codes
R ABS0831 and E0163
R Figure 004

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```
R  3. E0161, E0163 and E0165 plugs - E0162 and E0164 receptacles

R     A. P/N identification
R        E0161    D     01 A     01     X
R        E0162    |      |       |      |
R        E0163    |      |       |      |_________ Variant code
R        E0164    |      |       |
R        E0165    |      |       ------------------ Polarization code
R          |      |      -------------------------- Contact configuration code
R          |      ---------------------------------- Class code
R          ----------------------------------------- Standard P/N

R     B. P/N characteristics

R        (1) Temperature
R            Minimum operating temperature is -65 deg.C (-85.00 deg.F)
R            Maximum operating temperature is +125 deg.C (+257.00 deg.F)

R        (2) Variant code
R            X = without contacts
R            No code = with contacts

R        (3) Polarization system
R            (Ref. Fig. 005, 006)

R        (4) Polarization setting
R            - Remove the two screws that attach the key retention plate.
R            - Put the keys in the correct position for connector coding (refer to
R              the polarization table).
R            - Put the polarization key retention plate in position.
R            - Install the two screws that attach the key retention plate.
R            - TORQUE the two screws to between 0.02 m.daN (1.7699 lbf.in) and
R              0.04 m.daN (3.5398 lbf.in) with a torque screwdriver.

R     C. Connector configurations
R        (Ref. Fig. 003, 004)

R     D. Contact configurations
R        Refer E0179 insert
```

EFF : ALL

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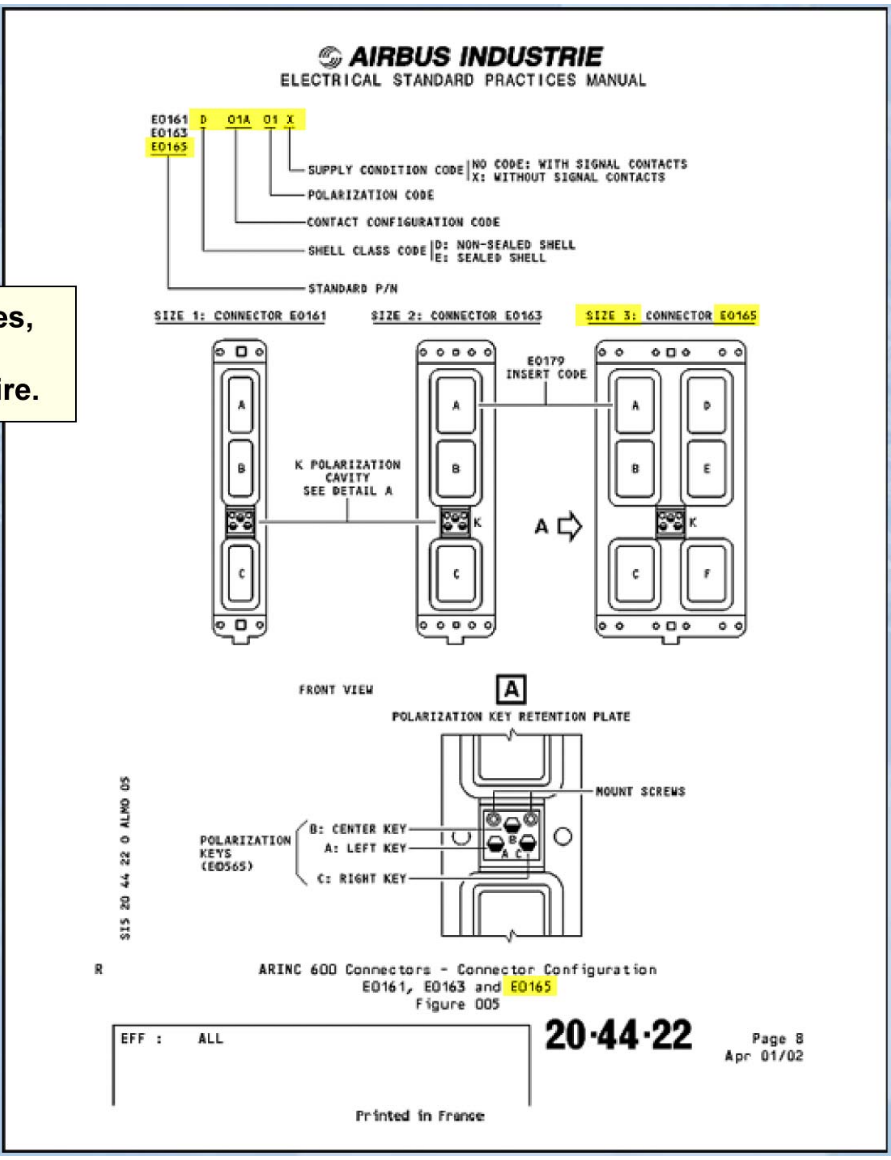

E0165

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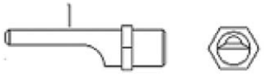
AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

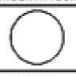
NOTE: POLARIZATION SYSTEM ONLY FOR E0161,E0163 AND E0165 PLUGS
POLARIZATION KEYS POSITION

POLARIZATION CODE			PLUGS (RACK) KEYS A	PLUGS (RACK) KEYS C	RECEPTACLES (EQUIPMENT) KEYS A	RECEPTACLES (EQUIPMENT) KEYS C
01	37	73	1	1	4	4
02	38	74	2	1	4	3
03	39	75	3	1	4	2
04	40	76	4	1	4	1
05	41	77	5	1	4	6
06	42	78	6	1	4	5
07	43	79	1	6	5	4
08	44	80	2	6	5	3
09	45	81	3	6	5	2
10	46	82	4	6	5	1
11	47	83	5	6	5	6
12	48	84	6	6	5	5
13	49	85	1	5	6	4
14	50	86	2	5	6	3
15	51	87	3	5	6	2
16	52	88	4	5	6	1
17	53	89	5	5	6	6
18	54	90	6	5	6	5
19	55	91	1	4	1	4
20	56	92	2	4	1	3
21	57	93	3	4	1	2
22	58	94	4	4	1	1
23	59	95	5	4	1	6
24	60	96	6	4	1	5
25	61	97	1	3	2	4
26	62	98	2	3	2	3
27	63	99	3	3	2	2
28	64		4	3	2	1
29	65		5	3	2	6
30	66		6	3	2	5
31	67		1	2	3	4
32	68		2	2	3	3
33	69		3	2	3	2
34	70		4	2	3	1
35	71		5	2	3	6
36	72		6	2	3	5

POLARIZATION CODE	PLUGS (RACK) B KEY	RECEPTACLES (EQUIPMENT) B KEY
01 TO 36	1	4
37 TO 72	2	3
73 TO 99	3	2



NOTE: DARK AREA REPRESENTS THE EXTENDED PART OF THE POLARIZATION DEVICE

POSITION NUMBER	KEY ORIENTATION
0	
1	
2	
3	
4	
5	
6	

SIS 20 44 22 0 ANMO 02

R ARINC 600 Connectors - Polarization System
R E0161, E0163 and E0165
R Figure 006

EFF : ALL

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```
R  4. E0179 insert

R     A. P/N identification
R    E0179        01         C
R      |           |         |
R      |           |         ------------------- Manufacturer code | C = CANNON
R      |           |                                               | S = SOURIAU
R      |           |                                               | R = RADIALL
R      |           |
R      |           ----------------------------- Contact configuration code
R      |
R     ------------------------------------------ Standard P/N

R     B. P/N characteristics

R       (1) Temperature
R           Minimum operating temperature is -65 deg.C (-85.00 deg.F)
R           Maximum operating temperature is +125 deg.C (+257.00 deg.F)

R       (2) Contact configuration codes
R           (Ref. Fig. 007, 008)

R           NOTE : The new insulators of the manufacturers S have 3 locating pins
R                  and not only one. These new insulators for shell size 2 and 3
R                  are not interchangeable with the old ones. They are
R                  identified, from the old ones by a blue strip and three
R                  mechanical locating pins.

R  5. Connection Table
      (Ref. Fig. 009)
```

EFF : ALL

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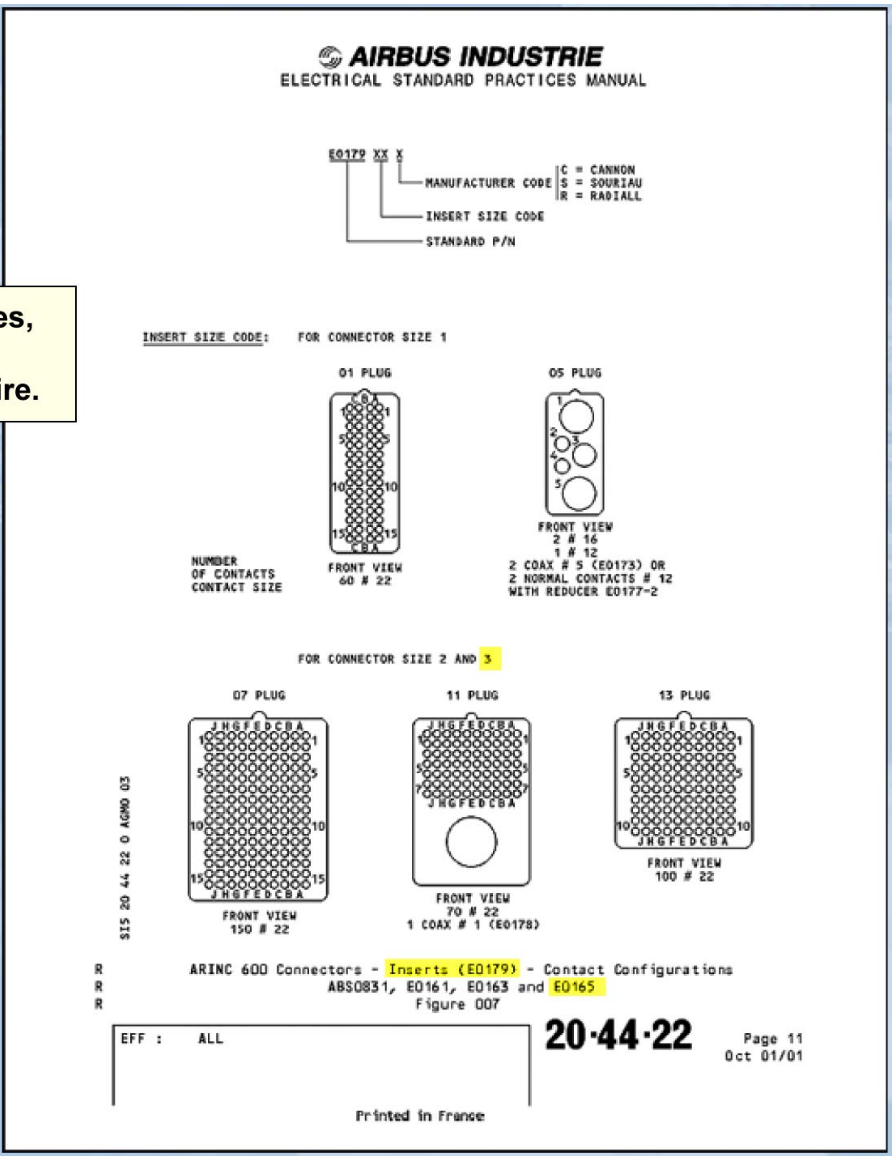

E0165

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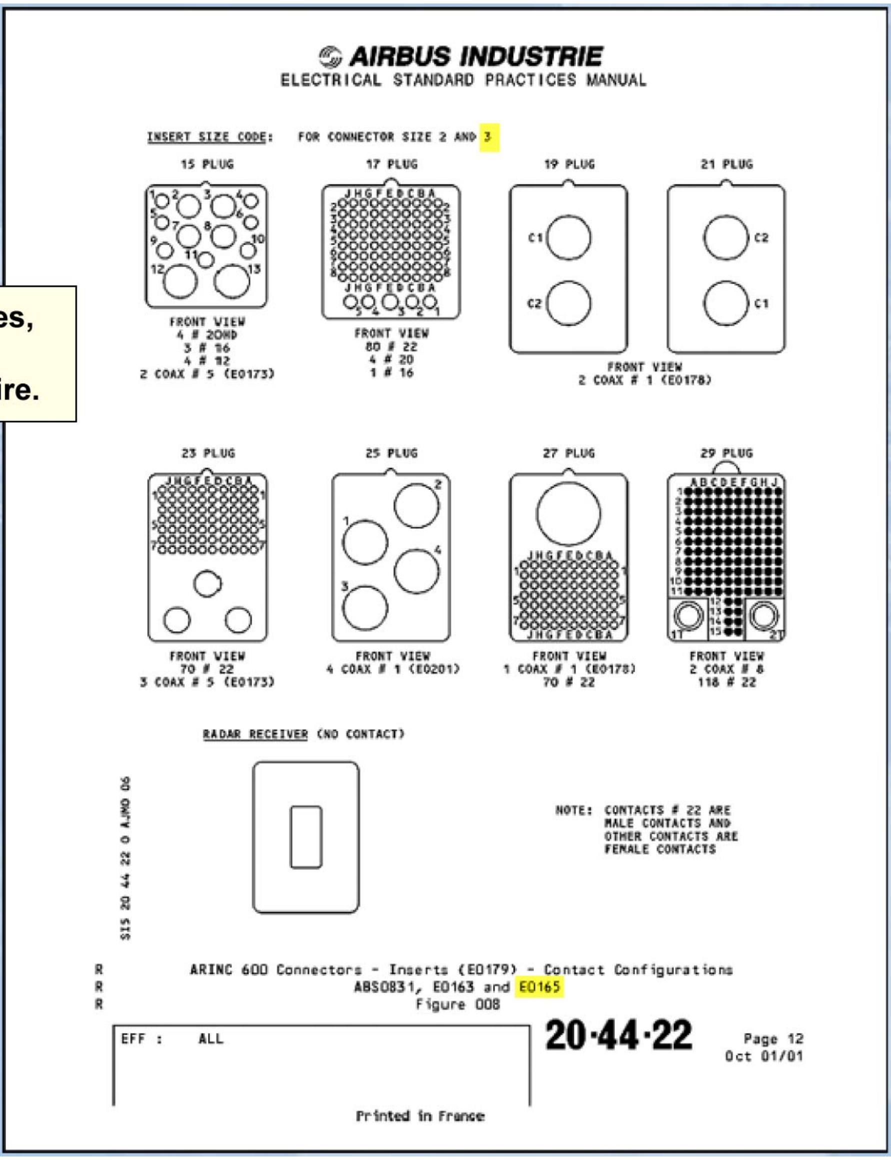

E0165

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ELECTRICAL STANDARD PRACTICES MANUAL

ELEMENTS		CONNECTION PROCEDURE XREF		
P/N	TYPE	CONNECTION TYPE MISCELLANEOUS	CONNECTION P/N MISCELLANEOUS P/N	ATA REF
ABS0831	PLUG	BY GROUNDING CONTACT	ABS0832LK1216 ABS0832KK1216	20-48-22
E0179	INSERT	BY CONTACTS	E0170FAXXXX E0171LAXXXX	20-48-22
		BY COAXIAL CONTACTS	* E0173XXX	20-48-31
			E0178XXX	
			E0201XXX	
		SLEEVE	NSA937494 OR E0718	20-48-22

* FOR SIZE 5, IF NECESSARY REPLACE BY A REDUCER E0177-2 WITH A NORMAL CONTACT E0170 OR E0171 SIZE 12.

NOTE: INSERT E0179 USED ON THE FOLLOWING CONNECTOR P/N :
ABS0831
E0161
E0163
E0165

NOTE: MANUFACTURER'S CONTACTS MUST BE INSTALLED ON SAME MANUFACTURER'S CONNECTORS

SIS 20 44 22 0 AZMO 07

R

ARINC 600 Connectors - Connection table
Figure 009

EFF : ALL

20·44·22

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X8U08481 - X0332T0 - XM203800000001

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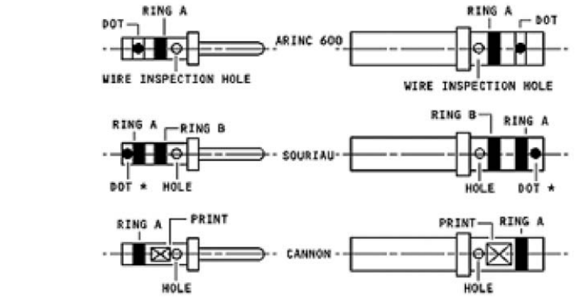
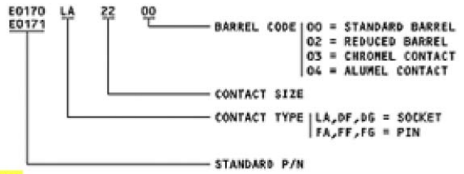
AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL



* ONLY FOR THERMOCOUPLE CONTACTS



PIN:E0170XXXXXX
SOCKET:E0171XXXXXX

CONTACT		IDENTIFICATION CONTACT	PRINT OR DOT	RING A	RING B	ADMISSIBLE WIRE GAUGE
PIN	SOCKET					
FA2200	LA2200	ARINC 600	DOT GREEN	ORANGE	-	26 TO 22
FF2203	DF2203	ARINC 600	DOT YELLOW	ORANGE	-	
		SOURIAU	DOT YELLOW	GREEN	ORANGE	
		CANNON	PRINT "CH"	WHITE	-	
FG2204	DG2204	ARINC 600	DOT BLACK	ORANGE	-	
		SOURIAU	DOT BLACK	GREEN	ORANGE	
		CANNON	PRINT "AL"	GREEN	-	
FA2000	LA2000	ARINC 600	DOT RED	ORANGE	-	24 TO 20
FA1600	LA1600	ARINC 600	DOT BLUE	ORANGE	-	20 TO 16
-	LA1602	-	-	ORANGE	-	24 TO 18
FA1200	LA1200	ARINC 600	DOT YELLOW	ORANGE	-	16 TO 12
-	LA1202	-	-	ORANGE	-	24 TO 18

SIS 20 48 22 0 AAMO 02

Normal Contacts - P/N Characteristics
E0170 and E0171
Figure 003

EFF : ALL

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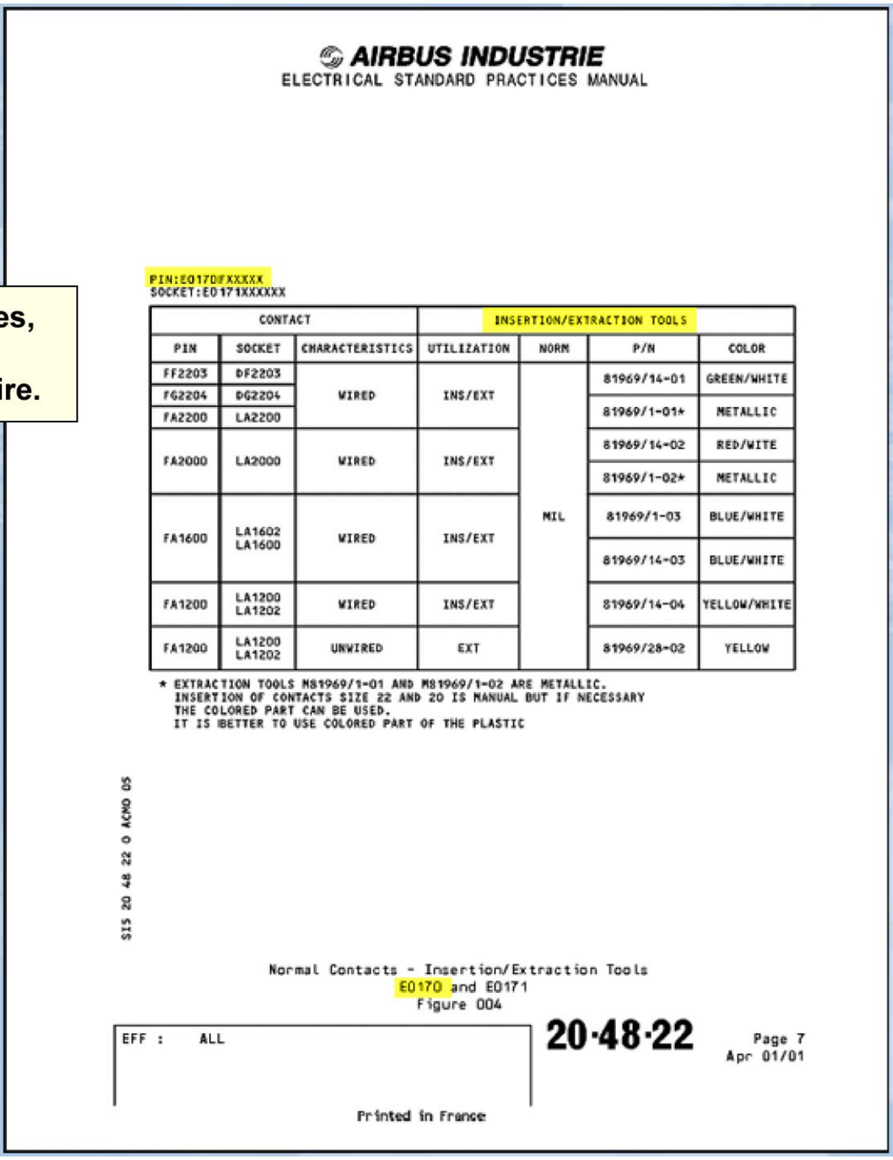

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PIN:E0170FXXXXX
SOCKET:E0171XXXXXX

CONTACT			INSERTION/EXTRACTION TOOLS			
PIN	SOCKET	CHARACTERISTICS	UTILIZATION	NORM	P/N	COLOR
FF2203	DF2203	WIRED	INS/EXT	MIL	81969/14-01	GREEN/WHITE
FG2204	DG2204				81969/1-01*	METALLIC
FA2200	LA2200					
FA2000	LA2000	WIRED	INS/EXT		81969/14-02	RED/WITE
					81969/1-02*	METALLIC
FA1600	LA1602 LA1600	WIRED	INS/EXT		81969/1-03	BLUE/WHITE
					81969/14-03	BLUE/WHITE
FA1200	LA1200 LA1202	WIRED	INS/EXT		81969/14-04	YELLOW/WHITE
FA1200	LA1200 LA1202	UNWIRED	EXT		81969/28-02	YELLOW

* EXTRACTION TOOLS M81969/1-01 AND M81969/1-02 ARE METALLIC.
INSERTION OF CONTACTS SIZE 22 AND 20 IS MANUAL BUT IF NECESSARY
THE COLORED PART CAN BE USED.
IT IS BETTER TO USE COLORED PART OF THE PLASTIC

SIS 20 48 22 0 ACMO 05

Normal Contacts - Insertion/Extraction Tools
E0170 and E0171
Figure 004

EFF : ALL

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E0165

X8U08481 - X0332T0 - XM203800000001

Here, by turning the pages, you can find all the information you require.

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NORMAL WIRE

CONTACT SIZE	STRIPPING		
	LENGTH A (mm)	TOOL	
		STRIPMASTER P/N	COLOR
22	4	45-2020-1	BLUE
20	4		
16	6.3		
12	6.3		
	6.3	45-1939-1	RED

SIS 20 48 22 0 AEM0 00

Normal Contacts - Wire Stripping and Stripping Tools
E0170 and E0171
Figure 005

EFF : ALL

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Here, by turning the pages, you can find all the information you require.

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PIN:E0170FXXXXX SOCKET:E0171LXXXXX,E0171DXXXXX

CONTACT	WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
FA2200 FF2203 FG2204	26	MIL	22520/2-01	MIL	22520/2-23	-	3
	24			ABS	0079-01		3
	22						4
LA2200 DF2203 DG2204	26			MIL	22520/2-23	-	3
	24						3
	22						4
FF2203 DF2203 FA2200 LA2200 FG2204 DG2204	26		22520/7-01	ABS	0080-01	-	2
	24						2
	22						3
FA2000 LA2000	24		22520/2-01	MIL	22520/2-08	-	5
			22520/7-01	DANIELS	86-79	-	4
	22		22520/2-01	MIL	22520/2-08	-	6
			22520/7-01	DANIELS	86-79	-	5
	20		22520/2-01	MIL	22520/2-08	-	7
			22520/7-01	DANIELS	86-79	-	6
LA1602	24		22520/1-01	MIL	22520/1-02	BLUE	2
			22520/7-01		22520/7-03	-	4
	22		22520/1-01		22520/1-02	BLUE	3
			22520/7-01		22520/7-03	-	5
	20		22520/1-01		22520/1-02	BLUE	4
			22520/7-01		22520/7-03	-	6
	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	7
FA1600 LA1600	20		22520/1-01		22520/1-02	BLUE	4
			22520/7-01		22520/7-03	-	5
	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	6
	16		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
LA1202 *	24		22520/1-01		22520/1-02	YELLOW	2
	22						3
	20						4
	18						5
FA1200 LA1200 *	16						6
	14						7
	12						8

* FOR SOCKETS GAUGE 12 IN CAVITY SIZE 5,USE A REDUCER E0177-02

SIS 20 48 22 0 AJMO 02

Normal Contacts - Crimping Tools
E0170 and E0171
Figure 007

EFF : ALL

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E0165

CONNECTORS

E0052

A320 AIRCRAFT WIRING LIST

	FIN	FUNCTIONAL DESIGNATION	FSCM / PART NUMBER VENDOR OR AIRLINE SN	SB OR COC REFERENCE	QTY	WDM REF LOCATION	EFFECT	EFFECT	EFFECT
	LCA MD1		PS4089060-901		1	210	404499		
	LCA MD1		PS4089062-901		1	210	403403		
	LCA MD2		PS4087605-901		1	210	403499		
	LCA MD3		PS4087600-902		1	210	403499		
N	1CA1	FMGC-1	B546CAM0103		1	22-84/01 83VU 127	402402		
N	1CA1	FMGC-1	C13042AA01		1	22-84/01 83VU 127	403499		
	1CA1	FMGC-1	F9111 THOMSON CSF SEXTANT A		1	22-84/01 83VU 127	102103	501502	507552
	1CA1	FMGC-1	F9111 B398BAM0205 THOMSON CSF SEXTANT A	E SB22-1006 I	1	22-84/01 83VU 127	POST	504506	
R	1CA1	FMGC-1	F9111 B398BAM0209 THOMSON CSF SEXTANT A	A SB22-1080 I	1	22-84/01 83VU 127	POST 510510	501501	504507
	1CA1	FMGC-1	F9111 B398BCM0108 THOMSON CSF SEXTANT A	E SB22-1069 I	1	22-84/01 83VU 127	POST 101101	001009	053056
R	1CA1	FMGC-1	F9111 B398BCM0109 THOMSON CSF SEXTANT A	A SB22-1081 I	1	22-84/01 83VU 127	POST 056056	001009	053053
	1CA1	FMGC-1	F9111 B546BAM0205 THOMSON CSF SEXTANT A		1	22-84/01 83VU 127	553556		
	1CA1	FMGC-1	F9111 B546BCM0204 THOMSON CSF SEXTANT A		1	22-84/01 83VU 127	104107	111199	
	1CA1	FMGC-1	F9111 B546CAM0102 THOMSON CSF SEXTANT A		1	22-84/01 83VU 127	401401		
R	1CA1	FMGC-1	F9111 B546CAM0103 THOMSON CSF SEXTANT A	A SB22-1084 I	1	22-84/01 83VU 127	POST 508508	401401 552556	502502
	1CA1	FMGC-1	F9111 B546CCM0101 THOMSON CSF SEXTANT A		1	22-84/01 83VU 127	109109		
R	1CA1	FMGC-1	F9111 B546CCM0105 THOMSON CSF SEXTANT A	A SB22-1083 I	1	22-84/01 83VU 127	POST	054054	101111
R	1CA1 A	CONNECTOR	E0165D01A01X		1	22-84/01 83VU 127	401499	501599	
	1CA1 A	CONNECTOR	E0165D01A03X		1	22-84/01 83VU 127	001050	053099	101199
	1CA1 X	MOUNT	D92516756000		1	22-84/01 83VU 127	001050 401401	053099 501599	101199
N	1CA1 X	MOUNT	F00036583000		1	22-84/01 83VU 127	402499		

XF EQUIPMENT LIST Feb 01/02 CIRCUIT CA PAGE 1

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3. ASN Index

	ASN	TOPIC NUMBER
	E0007	20-44-12
	E0027	20-45-13
	E0028	20-45-13
	E0029	20-44-32
	E0039	20-44-11
	E0040	20-44-11
	E0041	20-44-11
	E0042	20-45-13
R	E0048	20-46-50
	E0052	20-44-11
	E0053	20-44-11
	E0054	20-44-11
R	E0055	20-46-50
R	E0058	20-46-50
	E0061	20-45-13
	E0062	20-45-13
	E0064	20-45-14
R	E0065	20-46-50
R	E0066	20-46-50
R	E0067	20-46-50
R	E0068	20-46-50
R	E0069	20-46-50
	E0070	20-45-12
	E0071	20-45-12
	E0072	20-44-51
	E0073	20-43-41
R	E0074	20-25-52
R		20-33-31
R	E0075	20-25-52
R		20-33-31
	E0076	20-44-12
	E0077	20-44-13
	E0078	20-48-20
		20-48-25
	E0079	20-44-13
R	E0080	20-33-45
	E0083	20-44-21
	E0086	20-44-21
	E0087	20-44-21
	E0093	20-44-14
	E0094	20-44-14
		20-45-10

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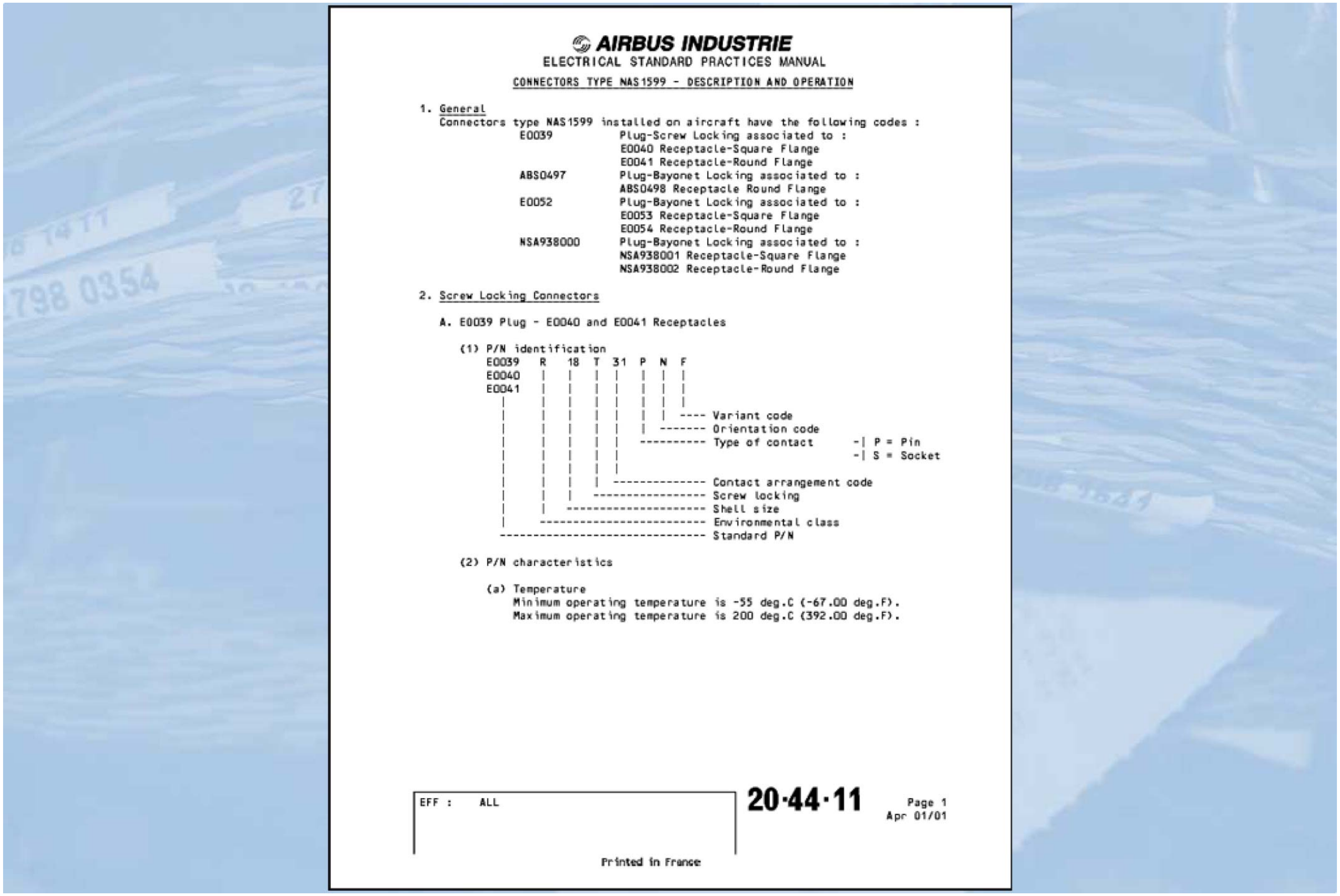

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

CONNECTORS TYPE NAS1599 - DESCRIPTION AND OPERATION

1. General

Connectors type NAS1599 installed on aircraft have the following codes :

E0039	Plug-Screw Locking associated to :	
	E0040 Receptacle-Square Flange	
	E0041 Receptacle-Round Flange	
ABS0497	Plug-Bayonet Locking associated to :	
	ABS0498 Receptacle Round Flange	
E0052	Plug-Bayonet Locking associated to :	
	E0053 Receptacle-Square Flange	
	E0054 Receptacle-Round Flange	
NSA938000	Plug-Bayonet Locking associated to :	
	NSA938001 Receptacle-Square Flange	
	NSA938002 Receptacle-Round Flange	

2. Screw Locking Connectors

A. E0039 Plug - E0040 and E0041 Receptacles

(1) P/N identification

```
E0039   R   18   T   31   P   N   F
E0040   |   |    |   |    |   |   |
E0041   |   |    |   |    |   |   |
  |     |   |    |   |    |   |   |
  |     |   |    |   |    |   |   ---- Variant code
  |     |   |    |   |    |   ------- Orientation code
  |     |   |    |   |    ---------- Type of contact      -| P = Pin
  |     |   |    |   |                                    -| S = Socket
  |     |   |    |   |
  |     |   |    |   -------------- Contact arrangement code
  |     |   |    ----------------- Screw locking
  |     |   --------------------- Shell size
  |     ------------------------ Environmental class
  ------------------------------ Standard P/N
```

(2) P/N characteristics

(a) Temperature

Minimum operating temperature is -55 deg.C (-67.00 deg.F).

Maximum operating temperature is 200 deg.C (392.00 deg.F).

EFF : ALL

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(b) Variant code

Code	Type of interfacial seals for pin-type contacts and rear grommet	Contact Supply
A	Fluorosilicon	Supplied
C		Not supplied
E	Special Elastomer	Supplied
F		Not supplied

(c) Contact arrangement code
(Ref. Fig. 001, 002)

EFF : ALL

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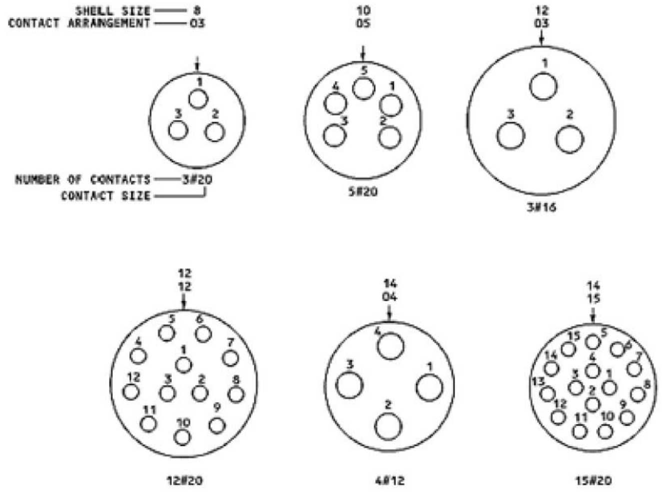
ELECTRICAL STANDARD PRACTICES MANUAL



SIS 20 44 11 0 AAM0 06

- ↓ SYMBOL FOR THE MAIN POSITIONING KEY OR GROOVE
- FRONT VIEW INSULATOR FOR PINS OR REAR VIEW INSULATOR FOR SOCKETS

Type NAS 1599 Connectors - Contact Arrangements
E0039 Plug
Figure 001

EFF : ALL

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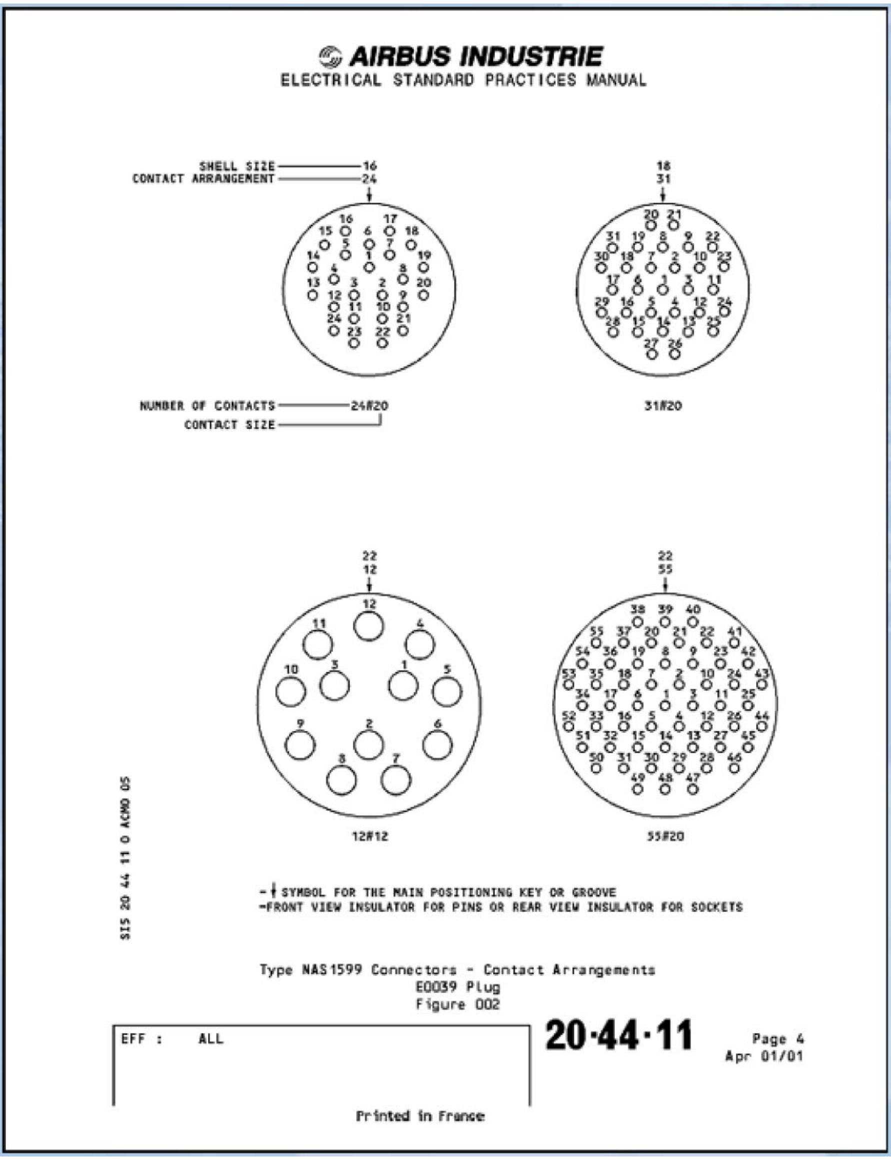
X8U08481 - X0332T0 - XM203800000001


AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
SHELL SIZE
CONTACT ARRANGEMENT
NUMBER OF CONTACTS
CONTACT SIZE
24#20
31#20
12#12
55#20
SYMBOL FOR THE MAIN POSITIONING KEY OR GROOVE
-FRONT VIEW INSULATOR FOR PINS OR REAR VIEW INSULATOR FOR SOCKETS
SIS 20 44 11 0 ACM0 05
Type NAS1599 Connectors - Contact Arrangements
E0039 Plug
Figure 002
EFF : ALL
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3. <u>Bayonet Locking Connectors</u>

A. ABS0497 Plug - ABS0498 Receptacle

(1) P/N identification

```
ABS0497   12   10  S  N
ABS0498   |    |   |  |
  |       |    |   |  |
  |       |    |   |  ------- Orientation code
  |       |    |   ---------- Type of contact       | P = Pin
  |       |    |                                    | S = Socket
  |       |    |
  |       |    -------------- Contact arrangement  code
  |       |
  |       |
  |       ------------------ Shell size
  ------------------------- Standard P/N
```

(2) P/N characteristics

(a) Temperature
Minimum operating temperature is -55 deg.C (-67.00 deg.F).
Maximum operating temperature is 100 deg.C (212.00 deg.F).

(b) Special Considerations
When ABS0497 is noted as ABS0498 it must withstand complete and continual immersion in fuel +2% Water.

(3) Contact arrangement code
(Ref. Fig. 003, 004)

B. E0052 Plug - E0053 and E0054 Receptacles

(1) P/N identification

EFF : ALL

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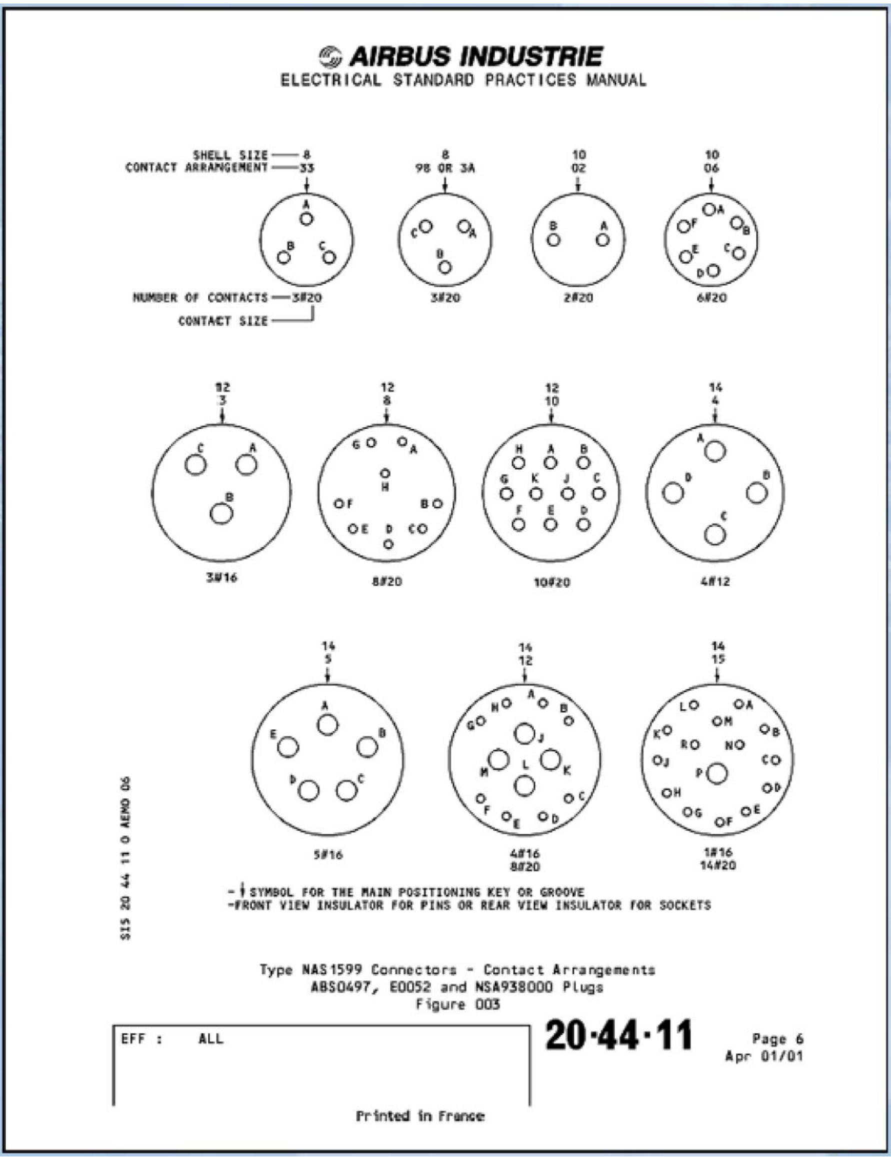

E0052

X8U08481 - X0332T0 - XM20380000000001

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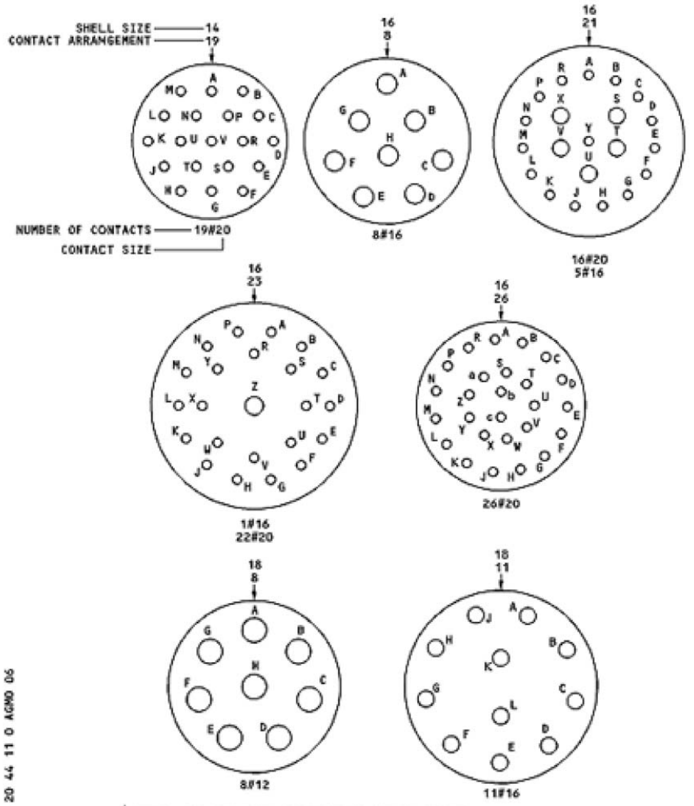
ELECTRICAL STANDARD PRACTICES MANUAL



- ↓ SYMBOL FOR THE MAIN POSITIONING KEY OR GROOVE
- FRONT VIEW INSULATOR FOR PINS OR REAR VIEW INSULATOR FOR SOCKETS

Type NAS1599 Connectors - Contact Arrangements
ABS0497, E0052 and NSA938000 Plugs
Figure 004

SIS 20 44 11 0 AGM0 06

EFF : ALL

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E0052

X8U08481 - X0332T0 - XM2038000000001

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```
E0052   R   22  B  41  S  N  F C
E0053   |   |   |  |   |  |  | |
E0054   |   |   |  |   |  |  | |
  |     |   |   |  |   |  |  | |
  |     |   |   |  |   |  |  | - Use Code ( optional )
  |     |   |   |  |   |  |  --- Variant code (Does no appear for plug)
  |     |   |   |  |   |  ------ Orientation code
  |     |   |   |  |   --------- Type of contact     | P = Pin
  |     |   |   |  |                                 | S = Socket
  |     |   |   |  |
  |     |   |   |  ------------- Contact arrangement  code
  |     |   |   |
  |     |   |   ---------------- Screw locking
  |     |   -------------------- Shell size
  |     |
  |     ------------------------ Version code   | R = Non conductive protection
  |                                             | N = Conductive protection
  ------------------------------ Standard P/N
```

(2) P/N characteristics

(a) Temperature
Minimum operating temperature is -55 deg.C (-67.00 deg.F).
Maximum operating temperature is 200 deg.C (392.00 deg.F).

(b) Variant code

Variant Code	Type of interfacial seals for pin-type contacts and rear grommet	Contact Supply
C	Fluorosilicon	Not supplied
E	Silicon Elastomer	Supplied
F	Silicon Elastomer	Not supplied

(c) Use code (optional)

NOTE : Only for contact arragement codes:
14-12, 16-8, 16-21, 20-16, 20-39, 22-41 and 24-31.
This code indicate the use of the coaxial contact
NSA938172.

EFF : ALL

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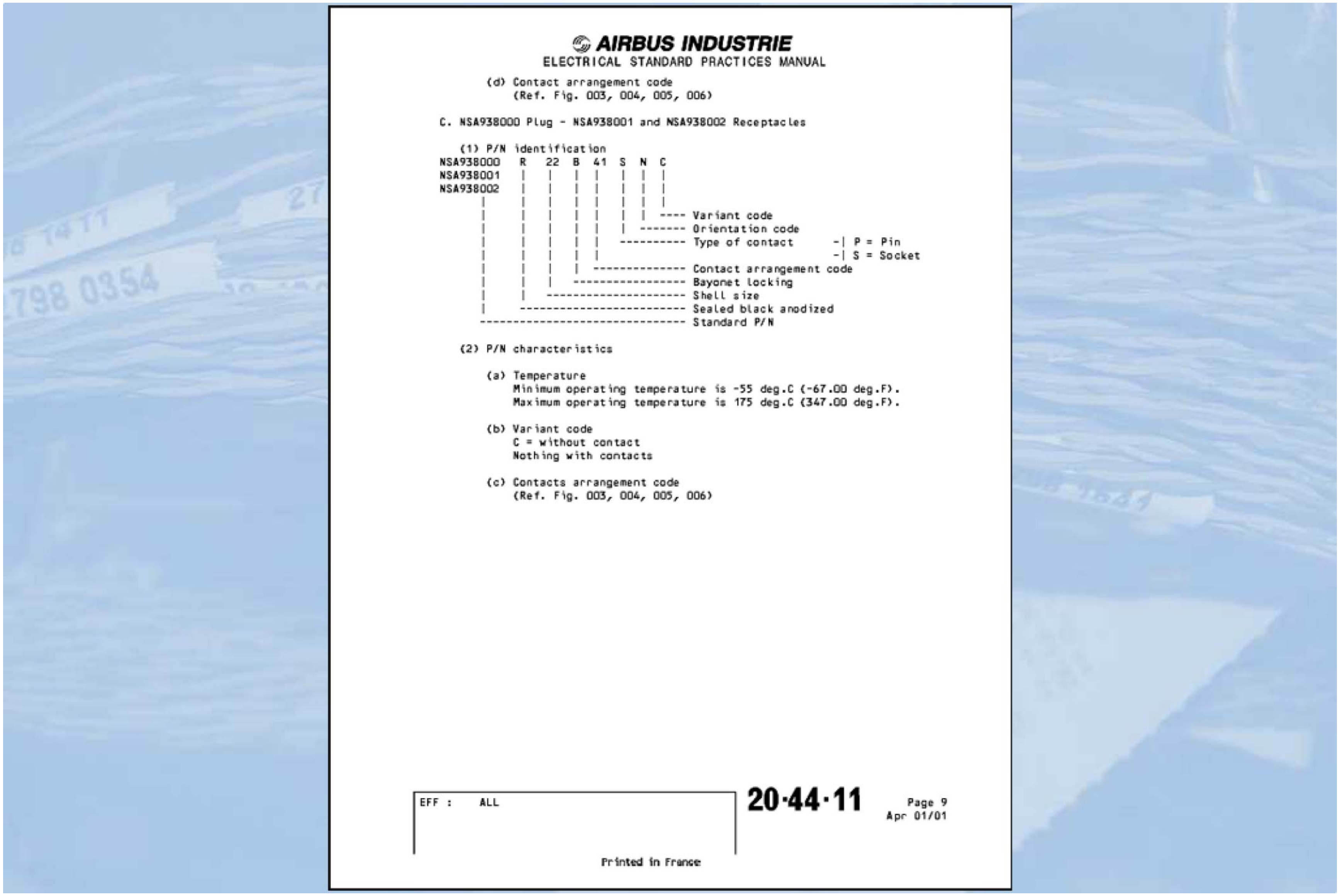
E0052



AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

(d) Contact arrangement code
(Ref. Fig. 003, 004, 005, 006)

C. NSA938000 Plug - NSA938001 and NSA938002 Receptacles

(1) P/N identification

```
NSA938000   R   22  B  41  S  N  C
NSA938001   |   |   |  |   |  |  |
NSA938002   |   |   |  |   |  |  |
   |        |   |   |  |   |  |  |
   |        |   |   |  |   |  |  ---- Variant code
   |        |   |   |  |   |  ------- Orientation code
   |        |   |   |  |   ---------- Type of contact      -| P = Pin
   |        |   |   |  |                                   -| S = Socket
   |        |   |   |  -------------- Contact arrangement code
   |        |   |   ----------------- Bayonet locking
   |        |   --------------------- Shell size
   |        ------------------------- Sealed black anodized
   ---------------------------------- Standard P/N
```

(2) P/N characteristics

(a) Temperature
Minimum operating temperature is -55 deg.C (-67.00 deg.F).
Maximum operating temperature is 175 deg.C (347.00 deg.F).

(b) Variant code
C = without contact
Nothing with contacts

(c) Contacts arrangement code
(Ref. Fig. 003, 004, 005, 006)

EFF : ALL

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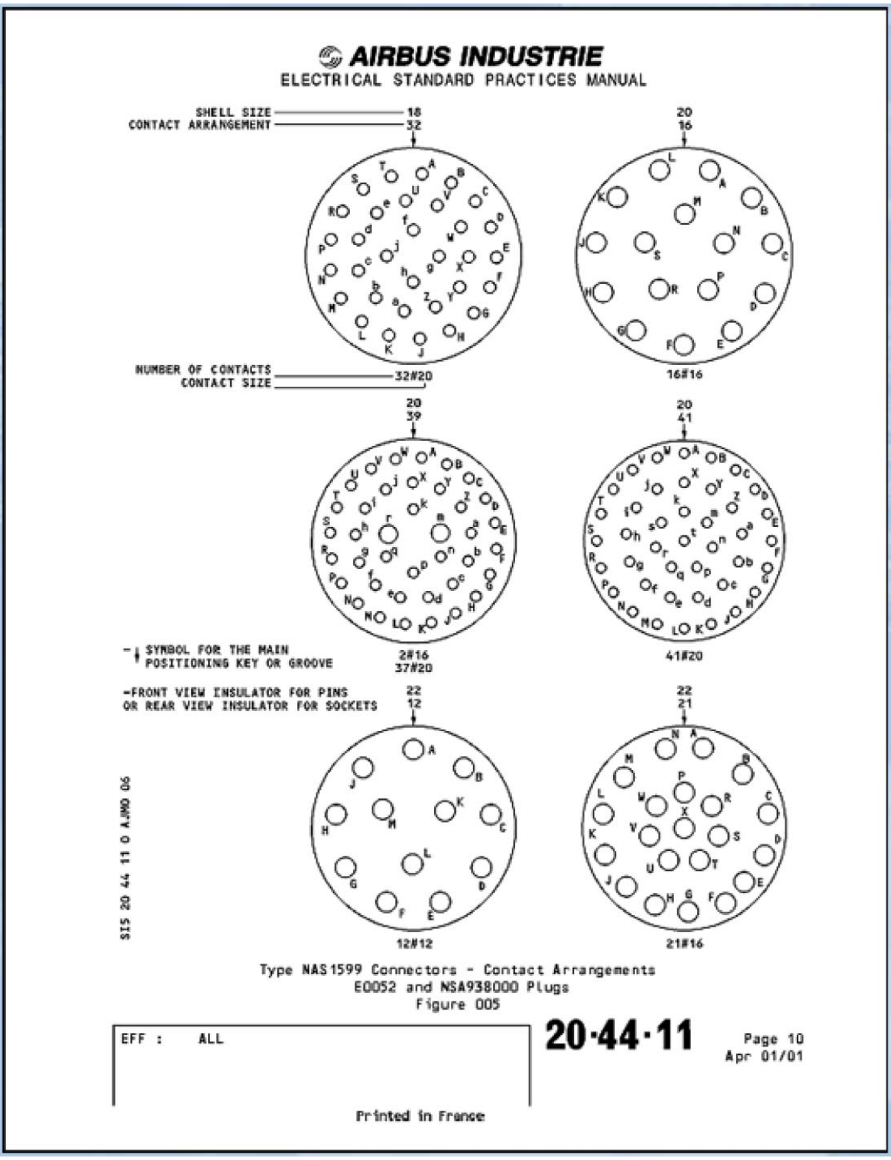
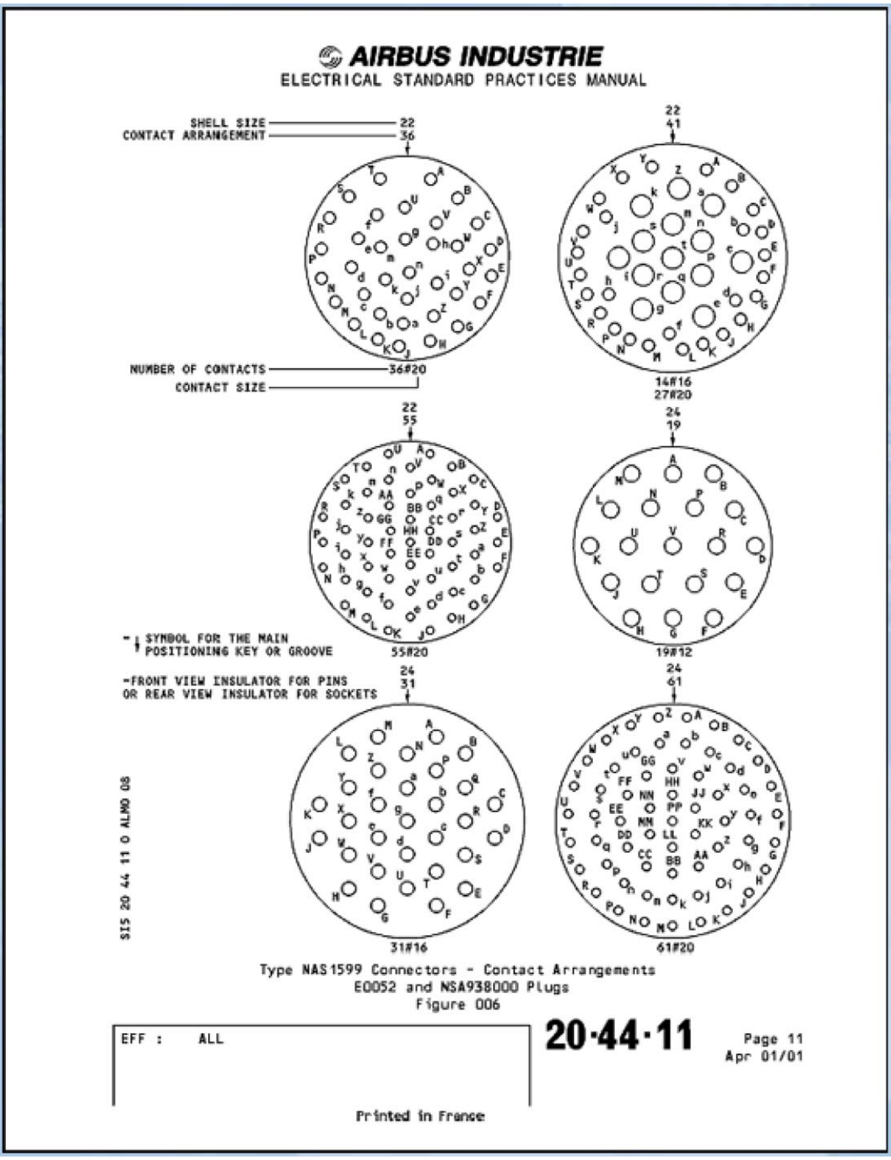


E0052

X8U08481 - X0332T0 - XM2038000000001


AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL
SHELL SIZE
CONTACT ARRANGEMENT
22
36
22
41
NUMBER OF CONTACTS
CONTACT SIZE
36#20
14#16
27#20
22
55
24
19
SYMBOL FOR THE MAIN POSITIONING KEY OR GROOVE
55#20
19#12
-FRONT VIEW INSULATOR FOR PINS OR REAR VIEW INSULATOR FOR SOCKETS
24
31
24
61
SIS 20 44 11 0 ALMO 08
31#16
61#20
Type NAS1599 Connectors - Contact Arrangements
E0052 and NSA938000 Plugs
Figure 006
EFF : ALL
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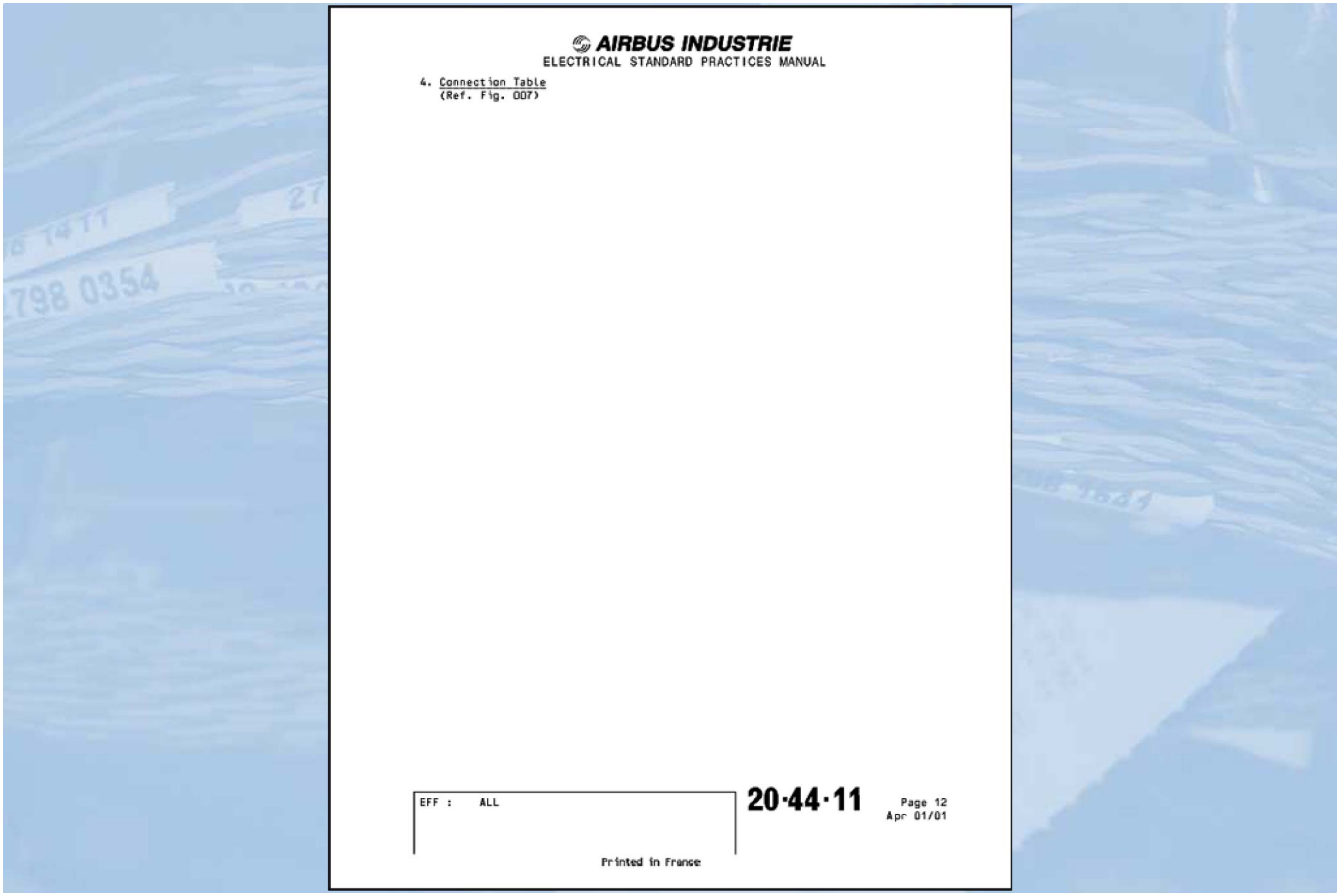
E0052



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ELECTRICAL STANDARD PRACTICES MANUAL

4. Connection Table
(Ref. Fig. 007)

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E0052

X8U08481 - X0332T0 - XM2038000000001

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ELEMENTS		CONNECTION PROCEDURE XREF		
P/N	TYPE	CONNECTION TYPE MISCELLANEOUS	CONNECTION P/N MISCELLANEOUS P/N	ATA REF
ABS0497	PLUG	BY CONTACTS	NSA938151PA2000 NSA938152SA2000	20-48-21
		BY COAXIAL CONTACTS	NSA938171PL1600 NSA938172SL1600	20-48-33
ABS0498	RECEPTACLE	BLANKING PLUG	NSA938153BAXXXX	20-48-41
E0039 E0052** NSA938000	PLUG	BY CONTACTS	NSA938151PXXXXX NSA938152SXXXXX	20-48-21
		* BY COAXIAL CONTACTS	NSA938171PL1600 NSA938172SL1600	20-48-33
		SLEEVES	E0160-1-0H NSA937210MBXXXX NSA937494-XX-XX OR E0718-XX-XX	20-48-21
E0040 E0041 E0053** E0054** NSA938001 NSA938002	RECEPTACLE	DUMMY CONTACT	NSA938195FE01	20-48-21
		BLANKING PLUGS	E0616BBXXXX NSA938153BAXXXX	20-48-41

NOTE : - " * " TO BE USED WITH COAXIAL WIRE CODE XE (RG 188A/U) INSTEAD OF THE NORMAL CONTACT SIZE 16.

- " ** " DUMMY CONTACTS ONLY FOR PLUGS MA OTHERWISE USE NORMAL CONTACTS FOR UNUSED POSITION .

SIS 20 44 11 0 BZM0 04

Type NAS1599 Connectors - Connection Table
Figure 007

EFF : ALL

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AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

3. Connection Procedure for Contacts NSA938151, NSA938152, EN3155-018 and EN3155-019.

A. Contacts P/N and Characteristics
(Ref. Fig. 010, 011)

CONTACTS	USE WITH	
	PLUG	RECEPTACLE
NSA938151 NSA938152 EN3155-018 EN3155-019	EN2997 - EN3646 ABS0364 - ABS0497 E0039 - E0052 - E0186 E0195 - E0320 - E0451 E0452 - E0579 NSA938000 SOURIAU 8915-61	EN2997 - EN3646 ABS0364 - ABS0498 E0040 - E0041 E0053 - E0054 E0187 - E0197 E0321 - E0322 E0454 - NSA938001 NSA938002
NSA938195	E0052	E0053 - E0054

B. Temperature
Minimum operating temperature is -65 deg.C (-85.00 deg.F)
Maximum operating temperature is +200 deg.C (+392.00 deg.F)

C. Contacts Insertion and Extraction Tools
(Ref. Fig. 012, 013)

D. Dummy Contacts
(Ref. Fig. 014)

E. Wire Stripping

(1) Normal Wire
(Ref. Fig. 015, 016, 017, 018)
- If sealing is necessary, install the heat-shrinkable sleeve on the wire before stripping. Shrinking is made after crimping.
- Select the applicable tool.
- Strip to the wire length "A".

(2) Special Wires
(Ref. Fig. 015, 016, 017, 018)
E0437 DL22 and DL20
NSA935132 DJ20

EFF : ALL

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NSA918151PXXXXX: NSA938152SXXXXX:

WIRE INSPECTION HOLE WIRE INSPECTION HOLE

NSA938151 P A 2000
NSA938152 S A 2000

- SIZE BARREL CODE — 00: STANDARD CRIMP BARREL; 01: ENLARGED CRIMP BARREL; 02: REDUCED CRIMP BARREL
- CONTACT SIZE CODE
- TYPE CODE — A: COPPER ALLOY (GOLD FINISH); B: CHROMEL CONTACT (NO MAGNETIC) (SPECIFIC FOR CHROMEL WIRE); C: ALUMEL CONTACT (MAGNETIC) (SPECIFIC FOR ALUMEL WIRE)
- CONTACT TYPE CODE — S: FEMALE CONTACT/SOCKET; P: MALE CONTACT/PIN
- STANDARD P/N

ISO SPECIFICATION COLOR IDENTIFICATION: MIL SPECIFICATION COLOR IDENTIFICATION:

RING B RING A RING B RING A
DOT (1) RING C

(1) ONLY FOR THERMOCOUPLE CONTACTS

PIN:NSA938151PXXXXX
SOCKET:NSA938152SXXXXX

CONTACT		COLOR IDENTIFICATION				ADMISSIBLE WIRE GAUGE
PIN	SOCKET	SPECIFICATION	RING A	RING B	RING C OR DOT	
PA2000	SA2000	ISO 8843	RED	VIOLET	-	24 TO 18
PB2000	-	MIL-C-39029/9	BROWN	ORANGE	GREEN	24 TO 20
	SB2000	ISO 8843	RED	RED	YELLOW	
-		MIL-C-39029/9	BROWN	YELLOW	BROWN	
PC2000	-	MIL-C-39029/9	BROWN	ORANGE	YELLOW	
	SC2000	ISO 8843	RED	RED	BLACK	
-		MIL-C-39029/9	BROWN	YELLOW	BLACK	
PA1600	SA1600	ISO 8843	BLUE	BLUE	-	20 TO 16
-	SB1600	ISO 8843	BLUE	BLUE	YELLOW	
-		MIL-C-39029/9	GREEN	RED	RED	
-	SC1600	ISO 8843	BLUE	BLUE	BLACK	
-		MIL-C-39029/9	GREEN	RED	BROWN	
PA1601	SA1601	ISO 8843	BLUE	ORANGE	-	18 TO 14
PA1602	SA1602	ISO 8843	BLUE	VIOLET	-	24 TO 18
-	SB1602	ISO 8843	BLUE	RED	YELLOW	24 TO 20
-	SC1602	ISO 8843	BLUE	RED	BLACK	
PA1200	SA1200	ISO 8843	YELLOW	YELLOW	-	14 AND 12
-	SA1202	ISO 8843	YELLOW	VIOLET	-	24 TO 18

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Normal Contacts - P/N Characteristics
NSA938151 and NSA938152
Figure 010

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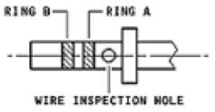
ELECTRICAL STANDARD PRACTICES MANUAL

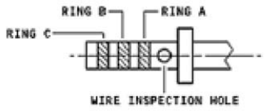
EN3155-018 M 20 20
EN3155-019 F 20 20

- BARREL SIZE
- CONTACT SIZE
- CONTACT TYPE AND IDENTIFICATION CODE:
  - M: MALE REFER TO ISO 8843 OR TO MIL-C-39029
  - P: MALE REFER TO MIL-C-39029
  - Y: MALE REFER TO ISO 8843
  - F: FEMALE REFER TO ISO 8843 OR TO MIL-C-39029
  - S: FEMALE REFER TO MIL-C-39029
  - X: FEMALE REFER TO ISO 8843
- STANDARD P/N

ISO SPECIFICATION COLOR IDENTIFICATION:



MIL SPECIFICATION COLOR IDENTIFICATION:



PIN: EN3155-018XXXXX
SOCKET: EN3155-019XXXXX

CONTACT		COLOR IDENTIFICATION				ADMISSIBLE WIRE GAUGE
PIN	SOCKET	SPECIFICATION	RING A	RING B	RING C	
2022		ISO 8843	RED	GREEN	-	26 TO 22
2020		ISO 8843	RED	RED	-	24 TO 20
P2020	-	MIL-C-39029/9	BROWN	BROWN	BLACK	
-	S2020		BROWN	BROWN	GREEN	
2018		ISO 8843	RED	BROWN	-	24 TO 18
1616		ISO 8843	BLUE	BLUE	-	20 TO 16
P1616	-	MIL-C-39029/9	BROWN	BROWN	BROWN	
-	S1616		BROWN	BROWN	BLUE	
1614		ISO 8843	BLUE	WHITE	-	18 TO 14
1618		ISO 8843	BLUE	BROWN	-	24 TO 18
1212		ISO 8843	YELLOW	YELLOW	-	14 AND 12
P1212	-	MIL-C-39029/9	BROWN	BROWN	ORANGE	
-	S1212		BROWN	BROWN	GREY	
1218		ISO 8843	YELLOW	BROWN	-	24 TO 18

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Normal Contacts - P/N Characteristics
EN3155-018 and EN3155-019
Figure 011

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AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

PIN:NSA938151PXXXXX
SOCKET:NSA938152SXXXXX

<table>
<tr><th colspan="3">CONTACT</th><th colspan="3">INSERTION/EXTRACTION TOOLS</th></tr>
<tr><th>PIN</th><th>SOCKET</th><th>CHARACTERISTICS</th><th>NORM</th><th>P/N</th><th>COLOR</th></tr>
<tr><td rowspan="2">PA2000</td><td rowspan="2">SA2000</td><td>WIRED</td><td>MIL</td><td>81969/14-11</td><td>RED/WHITE</td></tr>
<tr><td>UNWIRED</td><td>MIL</td><td>81969/30-05</td><td>RED/SILVER</td></tr>
<tr><td rowspan="3">PB2000</td><td rowspan="3">SB2000</td><td>WIRED</td><td>MIL</td><td>81969/14-02</td><td>RED/WHITE</td></tr>
<tr><td rowspan="4">UNWIRED</td><td>MIL</td><td>81969/30-05</td><td>RED/SILVER</td></tr>
<tr><td>SOURIAU</td><td>8522-56</td><td>RED</td></tr>
<tr><td rowspan="2">PC2000</td><td rowspan="2">SC2000</td><td>CANNON</td><td>CET 20-24</td><td>RED</td></tr>
<tr><td>DEUTSCH</td><td>M15571
+105910</td><td>RED</td></tr>
<tr><td>PA1600</td><td>SA1600</td><td>WIRED</td><td>MIL</td><td>81969/14-03</td><td>BLUE/WHITE</td></tr>
<tr><td>-</td><td>SB1600</td><td rowspan="6">UNWIRED</td><td>MIL</td><td>81969/30-06</td><td>BLUE/SILVER</td></tr>
<tr><td>-</td><td>SC1600</td><td>SOURIAU</td><td>8522-57</td><td>BLUE</td></tr>
<tr><td>PA1601</td><td>SA1601</td><td>CANNON</td><td>CET 16-21</td><td>BLUE</td></tr>
<tr><td>PA1602</td><td>SA1602</td><td rowspan="3">DEUTSCH</td><td rowspan="3">M15571
+105911</td><td rowspan="3">BLUE</td></tr>
<tr><td>-</td><td>SB1602</td></tr>
<tr><td>-</td><td>SC1602</td></tr>
<tr><td rowspan="3">PA1200</td><td rowspan="3">SA1200</td><td>WIRED</td><td>MIL</td><td>81969/14-04</td><td>YELLOW/WHITE</td></tr>
<tr><td rowspan="4">UNWIRED</td><td>MIL</td><td>81969/30-07</td><td>YELLOW/SILVER</td></tr>
<tr><td>SOURIAU</td><td>8522-58</td><td>YELLOW</td></tr>
<tr><td rowspan="2">-</td><td rowspan="2">SA1202</td><td>CANNON</td><td>CET 12-16</td><td>YELLOW</td></tr>
<tr><td>DEUTSCH</td><td>M15571
+105912</td><td>YELLOW</td></tr>
</table>

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Normal Contacts - Insertion/Extraction Tools
NSA938151 and NSA938152
Figure 012

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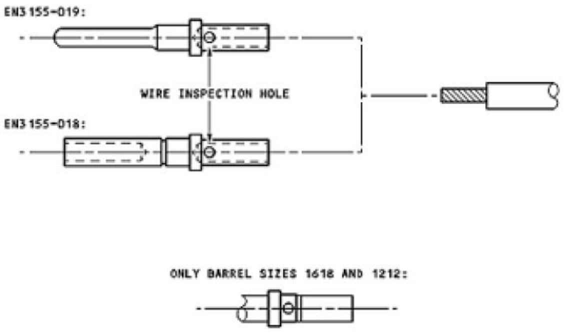
ELECTRICAL STANDARD PRACTICES MANUAL



PIN: EN3155-018XXXXX
SOCKET: EN3155-019XXXXX

CONTACT			INSERTION/EXTRACTION TOOLS			
PIN	SOCKET	CHARACTERISTICS	UTILIZATION	NORM	P/N	COLOR
2022 2020 2018		WIRED	INSERTION	MIL	81969/14-11	RED
			EXTRACTION		81969/14-11	WHITE
		UNWIRED	INSERTION		81969/14-11	RED
			EXTRACTION		81969/30-05	SILVER
1616 1614 1618		WIRED	INSERTION		81969/14-03	BLUE
			EXTRACTION			WHITE
		UNWIRED	INSERTION		81969/14-03	BLUE
			EXTRACTION		81969/30-06	SILVER
1212		WIRED	INSERTION		81969/14-04	YELLOW
			EXTRACTION			WHITE
1218		UNWIRED	INSERTION		81969/14-04	YELLOW
			EXTRACTION		81969/30-07	SILVER

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R Normal Contacts - Insertion/Extraction Tools
R EN3155-018 and EN3155-019
R Figure 013

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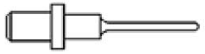
ELECTRICAL STANDARD PRACTICES MANUAL

DUMMY CONTACT



CONTACT SIZE	DUMMY CONTACT
20	NSA938195FE01
16	
12	

DUMMY CONTACTS ARE USED ONLY WITH E0052,E0053 AND E0054 CONNECTORS.

NSA938195FE01

DUMMY CONTACT SIZE	INSERTION/EXTRACTION TOOLS		
	NORM	P/N	COLOR
20	MIL	81969/30-05	RED/SILVER
	SOURIAU	8522-56	RED
	CANNON	CET 20-24	RED
	DEUTSCH	M15571+105910	RED

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R Dummy Contacts - Insertion/Extraction Tools
NSA938195
R Figure 014

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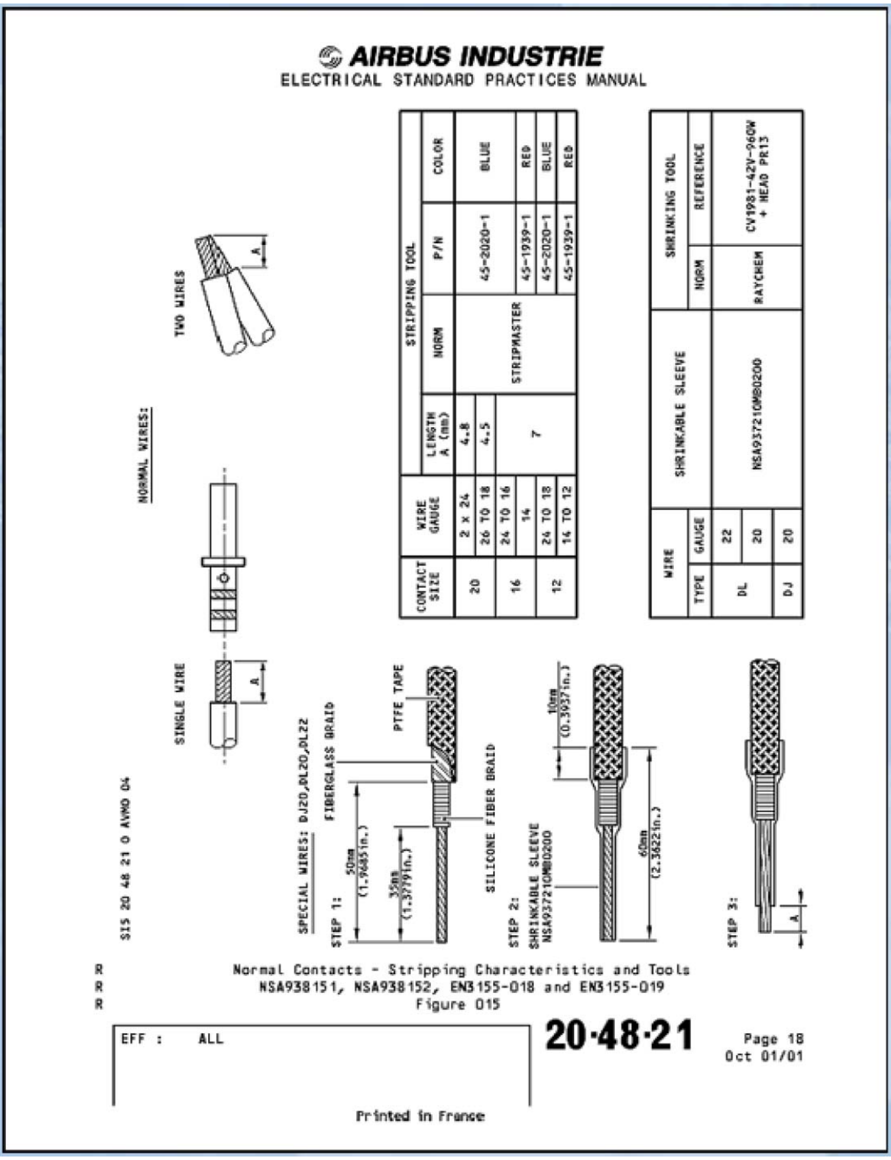

AIRBUS INDUSTRIE

ELECTRICAL STANDARD PRACTICES MANUAL

CONTACT SIZE	WIRE GAUGE	STRIPPING TOOL			
		LENGTH A (mm)	NORM	P/N	COLOR
20	2 x 24	4.8	STRIPMASTER	45-2020-1	BLUE
	26 TO 18	4.5			
16	24 TO 16	7			
	14			45-1939-1	RED
12	24 TO 18			45-2020-1	BLUE
	14 TO 12			45-1939-1	RED

WIRE		SHRINKABLE SLEEVE	SHRINKING TOOL	
TYPE	GAUGE		NORM	REFERENCE
DL	22	NSA937210MB0200	RAYCHEM	CV1981-42V-960W + HEAD PR13
	20			
DJ	20			

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R Normal Contacts - Stripping Characteristics and Tools
R NSA938151, NSA938152, EN3155-018 and EN3155-019
R Figure 015

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- Remove the fiberglass braid then the PTFE envelope over a length of 50 mm (1.9685 in.).
- Strip the core cable over a length of 35 mm (1.3779 in.).
- Install the heat shrinkable sleeve NSA937210MB0200 in order to cover the outer sheath over 10 mm (0.3937 in.) and shrink.
- Strip to the length "A".

(3) Coaxial Wire (Only for A310/A300-600)
(Ref. Fig. 018)
E0291 SW
These wire are used on the fuel system circuits.

- Strip the wire at the dimensions A and B.
- Install the heat shrinkable sleeve and shrink.
- If a shield repair is necessary:
  - Strip the braid at a distance of 100 mm (3.9370 in.) on a length of 8 mm (0.3149 in.).
  - Cut a wire gauge 24 on a length that permits to make a loop.
  - Put the solder sleeve and the shield termination wire on the coaxial wire and shrink.

F. Crimping Procedure

(Ref. Fig. 019, 020, 021)

- Engage the stripped wire into the contact.
- Make sure that you can see the wire conductor through the contact hole.
- Select the applicable tool.
- Install the contact in the positioner.
- Fully close the tool handles until the safety ratchet releases.
- Remove the crimped contact.
- If sealing is necessary:
  - Heat shrink the sleeve if installed before stripping.
  - If it is necessary to use several sleeves, wait until the first sleeve is fully cool before you shrink the other sleeves.

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AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

PIN:NSA938151PXXXXX
SOCKET:NSA938152SXXXXX

CONTACT	WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
PA2000 SA2000 PB2000 SB2000 PC2000 SC2000	2 x 24	MIL	22520/2-01	MIL	22520/2-02	-	6
			22520/7-01		22520/7-02		5
	24		22520/2-01		22520/2-02	-	5
			22520/7-01		22520/7-02		4
	22		22520/2-01		22520/2-02	-	6
			22520/7-01		22520/7-02		5
	20		22520/2-01		22520/2-02	-	7
			22520/7-01		22520/7-02		6
	18 (*)		22520/2-01		22520/2-02	-	8
			22520/7-01		22520/7-02		7
PA1600 SA1600 SB1600 SC1600	20		22520/1-01		22520/1-02	BLUE	4
			22520/7-01		22520/7-03	-	5
	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	6
	16		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
PA1601 SA1601 SB1601 SC1601	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	6
	16		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
	14		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
PA1602 SA1602 SB1602 SC1602	24		22520/1-01		22520/1-02	BLUE	2
			22520/7-01		22520/7-03	-	4
	22		22520/1-01		22520/1-02	BLUE	3
			22520/7-01		22520/7-03	-	5
	20		22520/1-01		22520/1-02	BLUE	4
			22520/7-01		22520/7-03	-	6
	18 (*)		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	7
PA1200 SA1200	16		22520/1-01		22520/1-02	YELLOW	6
	14						7
	12						8
SA1202	24		22520/1-01		22520/1-02	YELLOW	2
	22						3
	20						4
	18						5

(*) ONLY FOR CONTACTS NSA935151PAXXXX OR NSA938152SAXXXX

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Normal Contacts - Crimping Tools
NSA938151 and NSA938152
Figure 019

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AIRBUS INDUSTRIE
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PIN: EN3155-018XXXXX
SOCKET: EN3155-019XXXXX

CONTACT	WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
2022	26	MIL	22520/2-01	MIL	22520/2-02	-	2
			22520/7-01		22520/7-02	-	1
	24		22520/2-01		22520/2-02	-	3
			22520/7-01		22520/7-02	-	2
	22		22520/2-01		22520/2-02	-	4
			22520/7-01		22520/7-02	-	3
2020	24	MIL	22520/1-01	MIL	22520/1-02	RED	2
			22520/2-01		22520/2-02	-	5
			22520/7-01		22520/7-02	-	4
	22		22520/1-01		22520/1-02	RED	3
			22520/2-01		22520/2-02	-	6
			22520/7-01		22520/7-02	-	5
	20		22520/1-01		22520/1-02	RED	4
			22520/2-01		22520/2-02	-	7
			22520/7-01		22520/7-02	-	6
2018	24	MIL	22520/1-01	MIL	22520/1-02	RED	2
			22520/2-01		22520/2-02	-	5
			22520/7-01		22520/7-02	-	4
	22 2 X 24		22520/1-01		22520/1-02	RED	3
			22520/2-01		22520/2-02	-	6
			22520/7-01		22520/7-02	-	5
	20		22520/1-01		22520/1-02	RED	4
			22520/2-01		22520/2-02	-	7
			22520/7-01		22520/7-02	-	6
	18		22520/1-01		22520/1-02	RED	5
			22520/2-01		22520/2-02	-	8
			22520/7-01		22520/7-02	-	7

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R Normal Contacts - Crimping Tools
R EN3155-018 and EN3155-019
R Figure 020

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AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

PIN: EN3155-018XXXXX
SOCKET: EN3155-019XXXXX

CONTACT	WIRE GAUGE	HAND CRIMPING TOOL					
		TOOL		TURRET/LOCATOR			SELECTOR POSITION
		NORM	P/N	NORM	P/N	COLOR	
1616	20	MIL	22520/1-01	MIL	22520/1-02	BLUE	4
			22520/7-01		22520/7-03	-	5
	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	6
	16		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
1614	18	MIL	22520/1-01	MIL	22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	6
	16		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
	14		22520/1-01		22520/1-02	BLUE	6
			22520/7-01		22520/7-03	-	7
1618	24	MIL	22520/1-01	MIL	22520/1-02	BLUE	2
			22520/7-01		22520/7-03	-	4
	22		22520/1-01		22520/1-02	BLUE	3
			22520/7-01		22520/7-03	-	5
	20		22520/1-01		22520/1-02	BLUE	4
			22520/7-01		22520/7-03	-	6
	18		22520/1-01		22520/1-02	BLUE	5
			22520/7-01		22520/7-03	-	7
1212	14	MIL	22520/1-01	MIL	22520/1-02	YELLOW	7
	12						8
1218	24	MIL	22520/1-01	MIL	22520/1-02	YELLOW	2
	22						3
	20						4
	18						5

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Normal Contacts - Crimping Tools
EN3155-018 and EN3155-019
Figure 021

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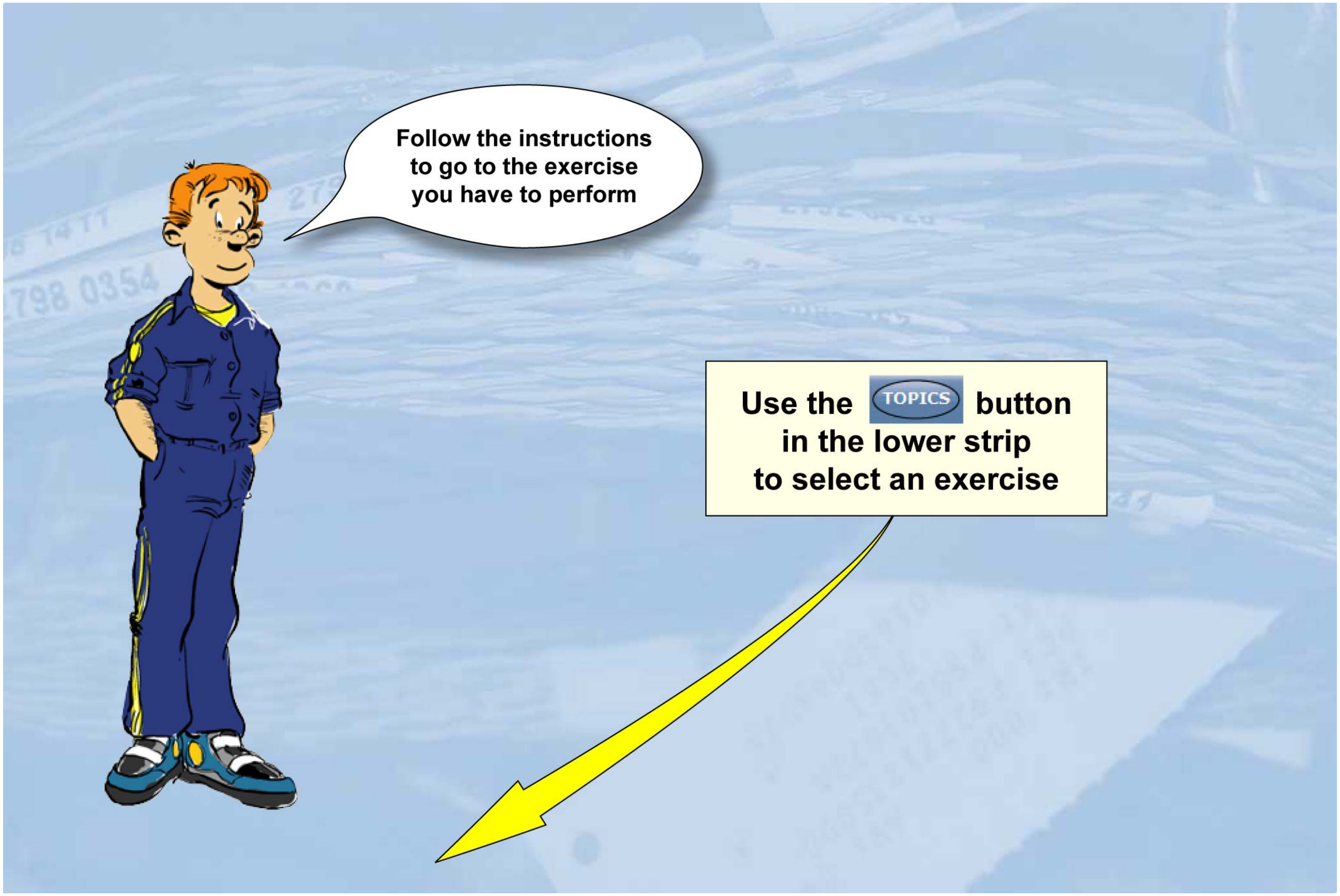
KEYWORDS

VIEWING INSTRUCTIONS

Follow the instructions to go to the exercise you have to perform.



VIEWING INSTRUCTIONS

KEYWORDS

CLEANING

AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

C

	MAIN KEY WORD	SECONDARY KEY WORD	TOPIC NUMBER
	Circuit Breakers	Cleaning	20-52-34
		Description and Connections	20-45-16
	Circular	Connector	20-44-10
		Miscellaneous connector	20-44-32
	Clamps	Installation	20-33-42
		Repair	20-53-42
	Cleaning	Circuit Breakers	20-55-50
		Bundle attachments	20-55-40
R		Bundle protections	20-55-30
		Conduits	20-55-30
		Connectors	20-55-50
		General	20-55-10
		Grounding Modules	20-55-50
		Processes	20-55-10
		Pushbutton switches, Lights	20-55-50
		Relays and Bases	20-55-50
		Standard Electrical Items	20-55-50
		Terminals, Terminal Block Modules	20-55-50
		Wires	20-55-20
	Clip	Safety Clips for Circuit Breakers	20-45-16
R	CO	Laser - Cables Marking Tool	20-25-61
R			
R	Coaxial	Sleeve Allocation Table	20-42-00
R			
		Cables - Repair	20-53-23
		Contacts - Connection Table	20-48-30
		Contacts - Repair	20-53-55
R		Connectors	20-44-30
	COLLINS	Insertion/Extraction tools	20-25-41
	Colonnette	Cable Supports - Description and Operation	20-33-41
	Compound	Pressure seal Compound - Procedure	20-43-42
	Conduits	Cleaning	20-55-30

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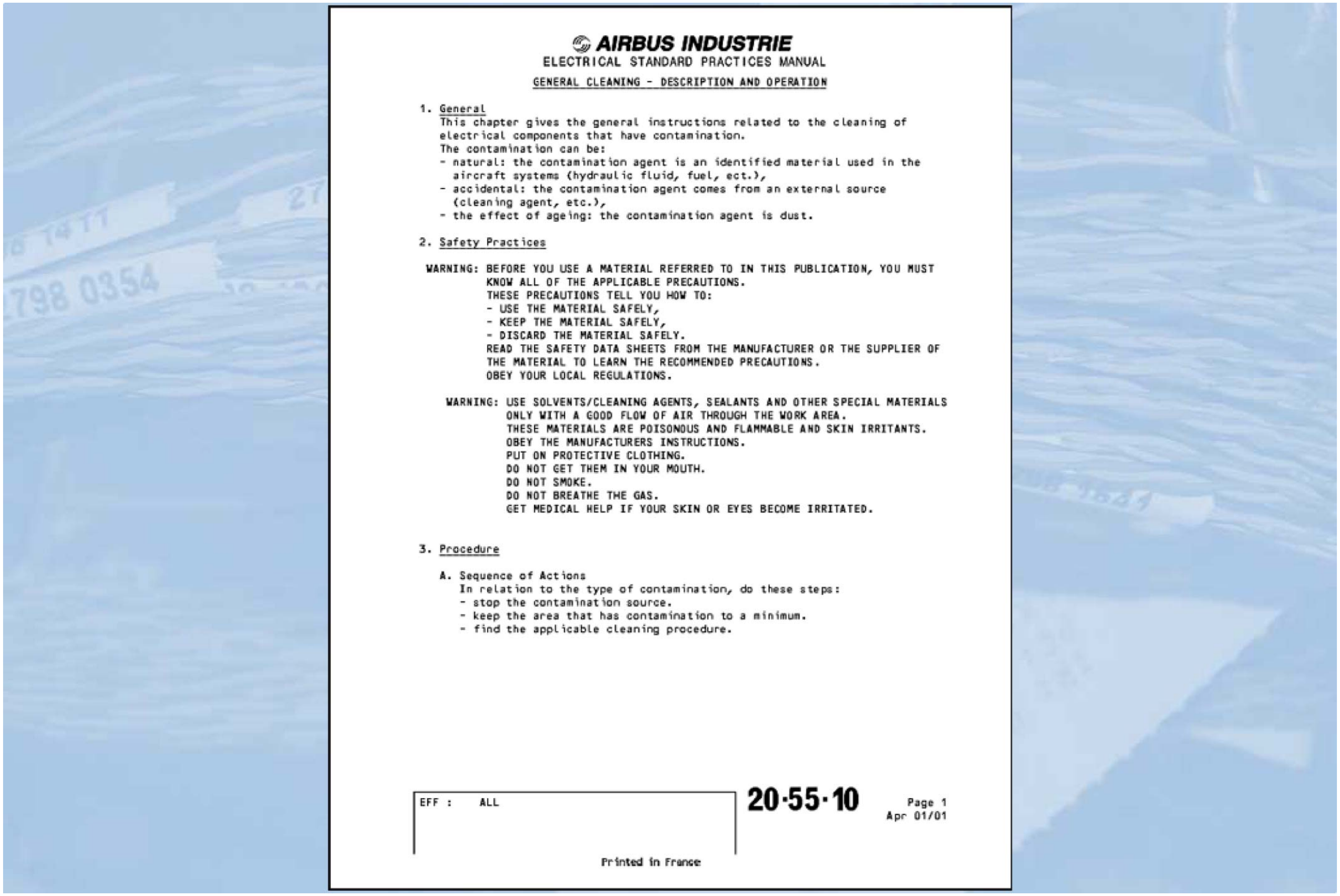
CLEANING



AIRBUS INDUSTRIE
ELECTRICAL STANDARD PRACTICES MANUAL

GENERAL CLEANING - DESCRIPTION AND OPERATION

1. General
This chapter gives the general instructions related to the cleaning of electrical components that have contamination.
The contamination can be:
- natural: the contamination agent is an identified material used in the aircraft systems (hydraulic fluid, fuel, ect.),
- accidental: the contamination agent comes from an external source (cleaning agent, etc.),
- the effect of ageing: the contamination agent is dust.

2. Safety Practices

WARNING: BEFORE YOU USE A MATERIAL REFERRED TO IN THIS PUBLICATION, YOU MUST KNOW ALL OF THE APPLICABLE PRECAUTIONS.
THESE PRECAUTIONS TELL YOU HOW TO:
- USE THE MATERIAL SAFELY,
- KEEP THE MATERIAL SAFELY,
- DISCARD THE MATERIAL SAFELY.
READ THE SAFETY DATA SHEETS FROM THE MANUFACTURER OR THE SUPPLIER OF THE MATERIAL TO LEARN THE RECOMMENDED PRECAUTIONS.
OBEY YOUR LOCAL REGULATIONS.

WARNING: USE SOLVENTS/CLEANING AGENTS, SEALANTS AND OTHER SPECIAL MATERIALS ONLY WITH A GOOD FLOW OF AIR THROUGH THE WORK AREA.
THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND SKIN IRRITANTS.
OBEY THE MANUFACTURERS INSTRUCTIONS.
PUT ON PROTECTIVE CLOTHING.
DO NOT GET THEM IN YOUR MOUTH.
DO NOT SMOKE.
DO NOT BREATHE THE GAS.
GET MEDICAL HELP IF YOUR SKIN OR EYES BECOME IRRITATED.

3. Procedure

A. Sequence of Actions
In relation to the type of contamination, do these steps:
- stop the contamination source.
- keep the area that has contamination to a minimum.
- find the applicable cleaning procedure.

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B. Type of Contamination

(1) Liquid contamination:
- stop the contamination source.
- make a sealed barrier, usually with cloth, to stop the liquid and prevent contamination of the adjacent areas.
- remove the contamination with cloth or a vacuum cleaner for liquids.

(2) Powder, granular or dust contamination:
- make sure that there are no draughts.
- remove the contamination with a vacuum cleaner.

C. Analysis of Accidental Contamination

If the contamination is accidental, find the characteristics of the contamination agent (Refer to the material manufacturer's documentation).
You must make an estimate of the risk of deterioration of the electrical items.
Some contamination agents can cause damage to the polymers used in the electrical items.
There can be a change in the electrical performance (insulation resistance, dielectric strength.).
Refer to the table to know if:
- you can clean the items.
- you must replace the items.

(1) Visually examine the area that has contamination
Examine the electrical items that have contamination for traces of damage.

Type of Damage	Procedure
- Discoloration (connectors, terminal blocks, modules, bases, etc.). - Cracks.	Replace the electrical item.
- Expansion of the sealing grommets (module, connectors, etc.).	Replace the electrical item.
- Supplier marks erased.	Replace the electrical item.
- Loss of label adhesion.	Replace the electrical item.
- Functional Item Number erased	Replace the electrical item

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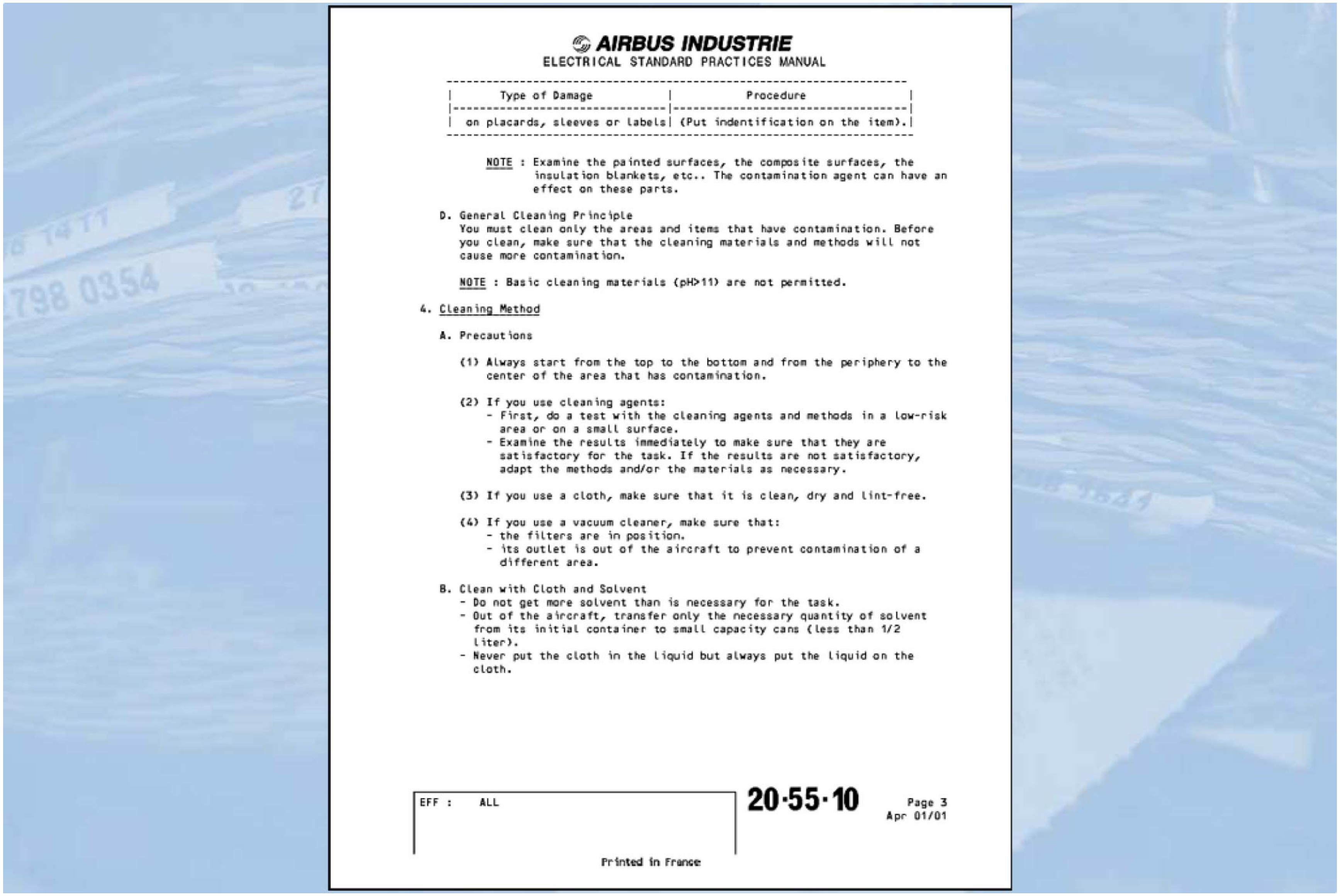

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Type of Damage	Procedure
on placards, sleeves or labels	(Put indentification on the item).

NOTE : Examine the painted surfaces, the composite surfaces, the insulation blankets, etc.. The contamination agent can have an effect on these parts.

D. General Cleaning Principle
You must clean only the areas and items that have contamination. Before you clean, make sure that the cleaning materials and methods will not cause more contamination.

NOTE : Basic cleaning materials (pH>11) are not permitted.

4. Cleaning Method

A. Precautions

(1) Always start from the top to the bottom and from the periphery to the center of the area that has contamination.

(2) If you use cleaning agents:
- First, do a test with the cleaning agents and methods in a low-risk area or on a small surface.
- Examine the results immediately to make sure that they are satisfactory for the task. If the results are not satisfactory, adapt the methods and/or the materials as necessary.

(3) If you use a cloth, make sure that it is clean, dry and lint-free.

(4) If you use a vacuum cleaner, make sure that:
- the filters are in position.
- its outlet is out of the aircraft to prevent contamination of a different area.

B. Clean with Cloth and Solvent
- Do not get more solvent than is necessary for the task.
- Out of the aircraft, transfer only the necessary quantity of solvent from its initial container to small capacity cans (less than 1/2 liter).
- Never put the cloth in the liquid but always put the liquid on the cloth.

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WARNING: USE SOLVENTS/CLEANING AGENTS, SEALANTS AND OTHER SPECIAL MATERIALS ONLY WITH A GOOD FLOW OF AIR THROUGH THE WORK AREA.
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DO NOT SMOKE.
DO NOT BREATHE THE GAS.
GET MEDICAL HELP IF YOUR SKIN OR EYES BECOME IRRITATED.

5. Types of Solvent

You can use these materials only if there is a natural contamination.
If these is an accidental contamination and you do not know the material that caused the contamination, you must not use solvents.

Natural Contamination	Recommended Cleaning Material
Aircraft hydraulic fluid Fuel and Oil/Grease De-icing fluids	Isopropyl Alcohol (Material No. 11-010) or equivalent.(Refer to the local regulations)
Anti-corrosion material Dust	
Accidental contamination	To be treated on a case-by-case basis dependent on the chemical nature of the material

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CLEANING OF WIRES - DESCRIPTION AND OPERATION

1. General
This chapter gives the instructions related to the cleaning of cables that have surface contamination or in-depth contamination. The CML codes of the cleaning products are given in 20-55-10.

2. Cleaning
- Use suction to remove the particles or a sponge to remove the liquids from the surface of the bundles.
- Locally remove the ties in the area that has contamination (300 mm (11.8110 in.) approx). Estimate if the contamination is on the surface or deeper (the contamination agent goes deep in the bundle).

A. Surface Contamination
- Do not remove the cable ties.
- Clean the bundles with a dry cloth or with a cloth moist with solvent. If you use a solvent, let it operate during 10 mn then clean again with a dry cloth.
- Install new cable ties in the cleaned area.
- Remove the old ties and clean their location.

NOTE : When the ties hold the bundle on supports, do not remove all the ties at the same time.
Replace the ties support by support.
Install a new cable tie at the same location.
Clean the support or replace it if necessary.

B. Deep Contamination
- Do the procedure on one bundle only at a time and on a small length.
- Remove the support ties first, then the others.
- Clean the cables one by one on the prepared length.
- Install the cable ties (maximum pitch: 150 mm (5.9055 in.); 100 mm (3.9370 in.) on the last 500 mm (19.6850 in.)).
- Install the bundle at its original location except at the two ends of the cleaned length. This is to make an overlap when you clean the subsequent section.
- Make new identification if necessary.

C. Special Conditions
Aluminum cables NSA935308YU and E0438YV.
The Polyamid Aromatic (NOMEX) braid can operate like a wick. Make sure that the drying operation is correct.
If basic materials (pH>11) caused the contamination, the polyimide insulation can have damage.

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If there is this type of damage, it is better to fully replace the feeder.

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CLEANING OF CONDUITS - DESCRIPTION AND OPERATION

1. General
This chapter gives the instructions related to the cleaning of the flexible conduits and the fabric sheaths.

The CML codes of the cleaning products are given in 20-55-10.

2. Flexible Conduits, Shielded Flexible Conduits

A. External Contamination
Use a Vacuum cleaner or a cloth to remove the contamination.
If necessary, complete the cleaning operation with a cloth moist with solvent then let dry.

B. Internal contamination
Make sure that the contamination agent is fully removed specially in the low points of the conduit.

(1) If there is a drain hole:
- Put it at the lowest point and make sure it is not blocked.

(2) If there is no drain:
- Move the conduit on the harness to have one end at a lowest point, or
- Make a drain hole at the lowest point, or
- Remove the conduit so that the contamination agent can flow out, clean the bundle and re-install a new conduit.

3. Fabric Sheaths
The Polyamid Aromatic (NOMEX) sheath can operate like a wick. Make sure that the drying operation is correct.

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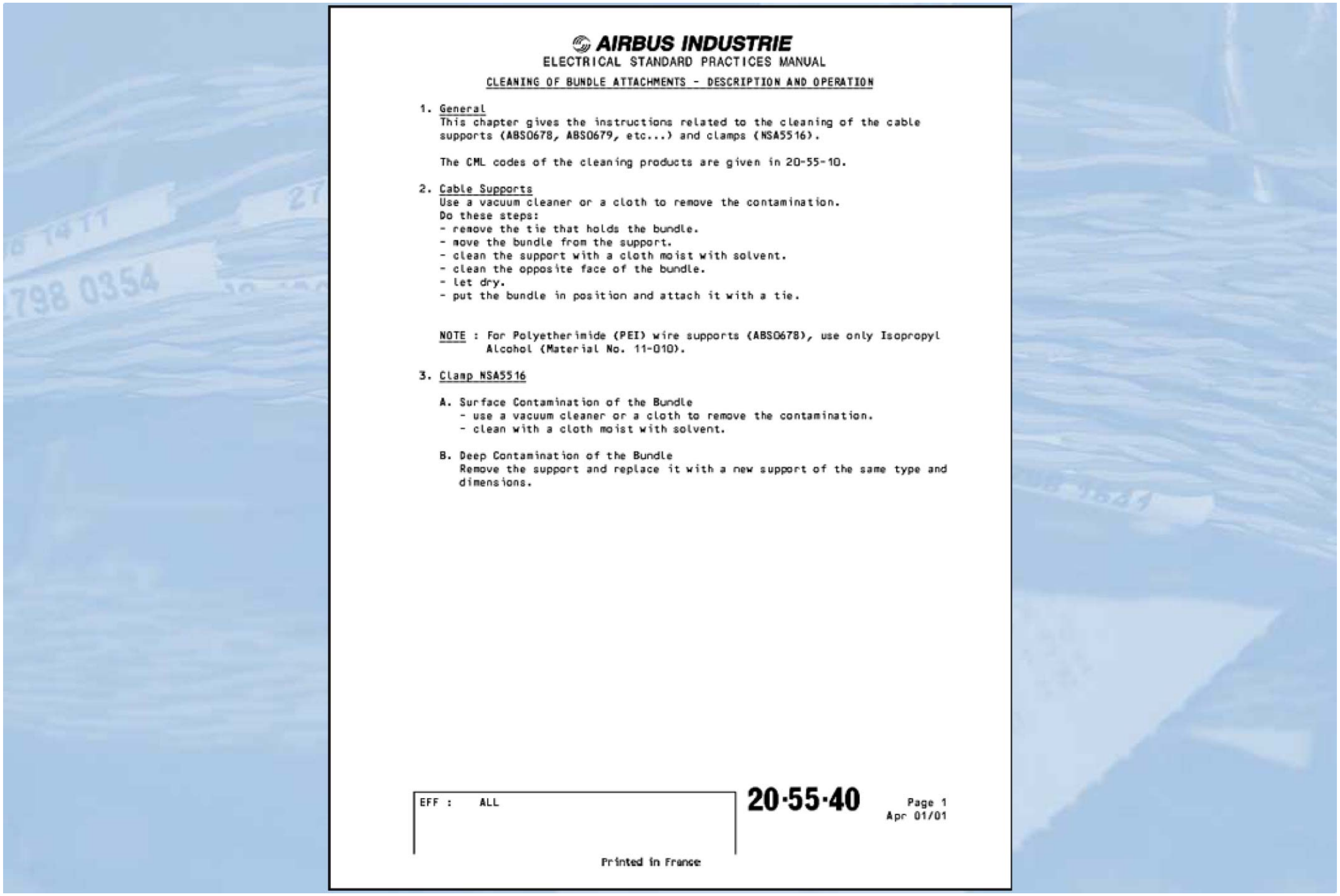

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CLEANING OF BUNDLE ATTACHMENTS - DESCRIPTION AND OPERATION

1. General
This chapter gives the instructions related to the cleaning of the cable supports (ABS0678, ABS0679, etc...) and clamps (NSA5516).

The CML codes of the cleaning products are given in 20-55-10.

2. Cable Supports
Use a vacuum cleaner or a cloth to remove the contamination.
Do these steps:
- remove the tie that holds the bundle.
- move the bundle from the support.
- clean the support with a cloth moist with solvent.
- clean the opposite face of the bundle.
- let dry.
- put the bundle in position and attach it with a tie.

NOTE : For Polyetherimide (PEI) wire supports (ABS0678), use only Isopropyl Alcohol (Material No. 11-010).

3. Clamp NSA5516

A. Surface Contamination of the Bundle
- use a vacuum cleaner or a cloth to remove the contamination.
- clean with a cloth moist with solvent.

B. Deep Contamination of the Bundle
Remove the support and replace it with a new support of the same type and dimensions.

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CLEANING OF STANDARD ELECTRICAL ITEMS - DESCRIPTION AND OPERATION

1. General
This chapter gives the instructions related to the cleaning of these items:
- connectors.
- terminal block modules.
- grounding modules.
- relays and bases.
- pushbutton switches, lights.
- circuit breakers.
- terminals.

The CML codes of the cleaning products are given in 20-55-10.

2. Type of Contamination
There are two types of contamination: surface and deep.
Before you do the cleaning procedure, you must know the type of contamination.
To find the type of contamination, do these steps:
- Remove one item of each family of items in the area that has contamination.
- Clean the surface of the item.
- Examine the item to know the type of contamination:
  . Surface contamination:
  the contamination agent does not go into the item.
  . Deep contamination:
  the contamination agent goes into the item. In this condition, we strongly recommend that you replace the item.

R NOTE : If there is a risk of a new contamination, you can replace a
R non-sealed item by a sealed item.

3. Safety Precautions
If you disconnect and connect an electrical line, you must do a continuity test and an insulation test to make sure that the circuit operates correctly.
Make sure that all the areas that you cleaned are dry before you energize the electrical circuits.

4. Connectors, Terminal Block Modules, Grounding Modules

A. Sealed Items

NOTE : Do not disconnect the sealed connectors, the terminal block modules or the grounding modules.

In the areas where there is risk of liquid contamination, the connectors or the terminal block modules are usually sealed. In these areas:
- do not move the wires in the cavities.
- apply the solvent as a spray on the item.
- let the solvent operate then dry with a clean cloth.

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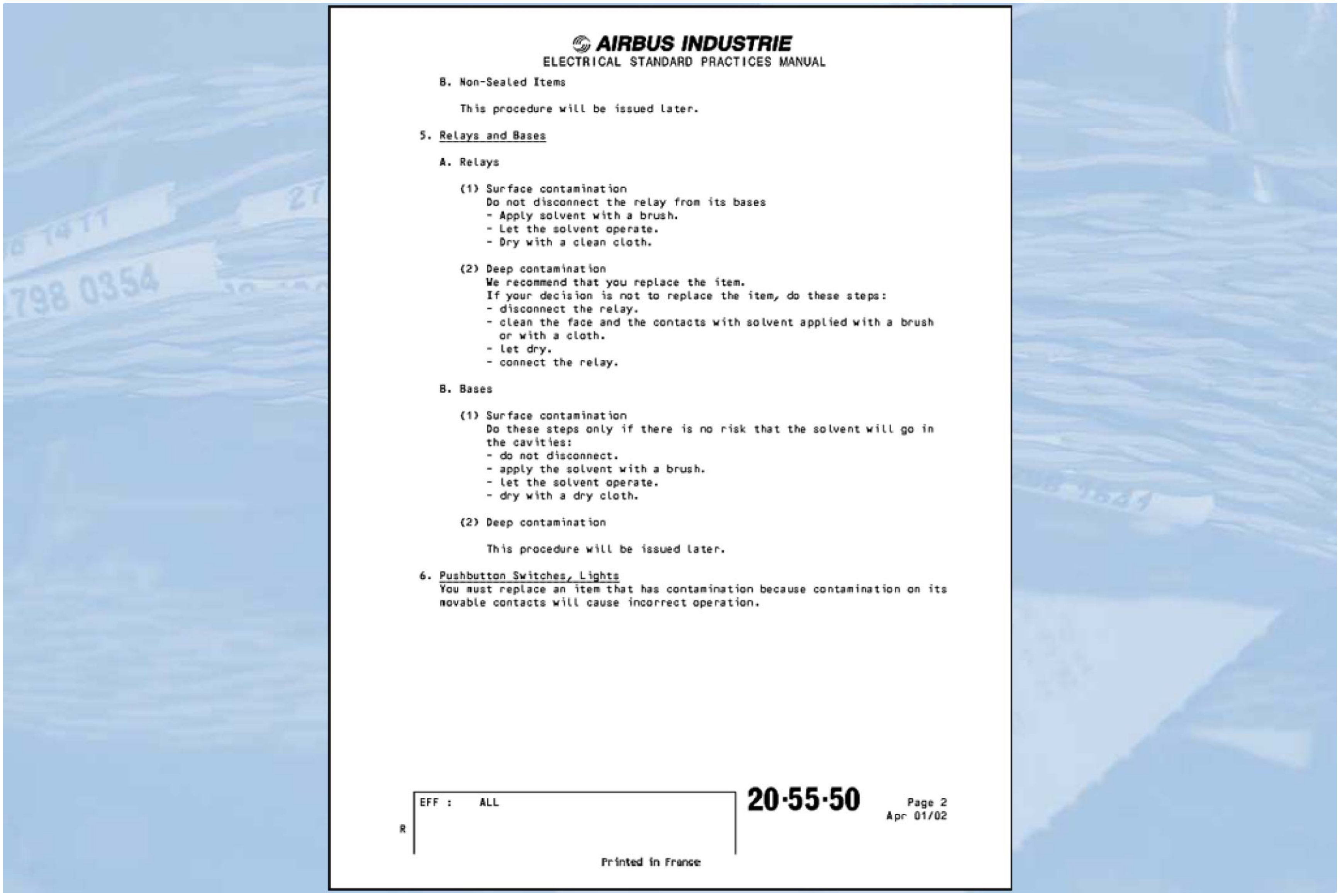

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B. Non-Sealed Items

This procedure will be issued later.

5. Relays and Bases

A. Relays

(1) Surface contamination
Do not disconnect the relay from its bases
- Apply solvent with a brush.
- Let the solvent operate.
- Dry with a clean cloth.

(2) Deep contamination
We recommend that you replace the item.
If your decision is not to replace the item, do these steps:
- disconnect the relay.
- clean the face and the contacts with solvent applied with a brush or with a cloth.
- let dry.
- connect the relay.

B. Bases

(1) Surface contamination
Do these steps only if there is no risk that the solvent will go in the cavities:
- do not disconnect.
- apply the solvent with a brush.
- let the solvent operate.
- dry with a dry cloth.

(2) Deep contamination

This procedure will be issued later.

6. Pushbutton Switches, Lights
You must replace an item that has contamination because contamination on its movable contacts will cause incorrect operation.

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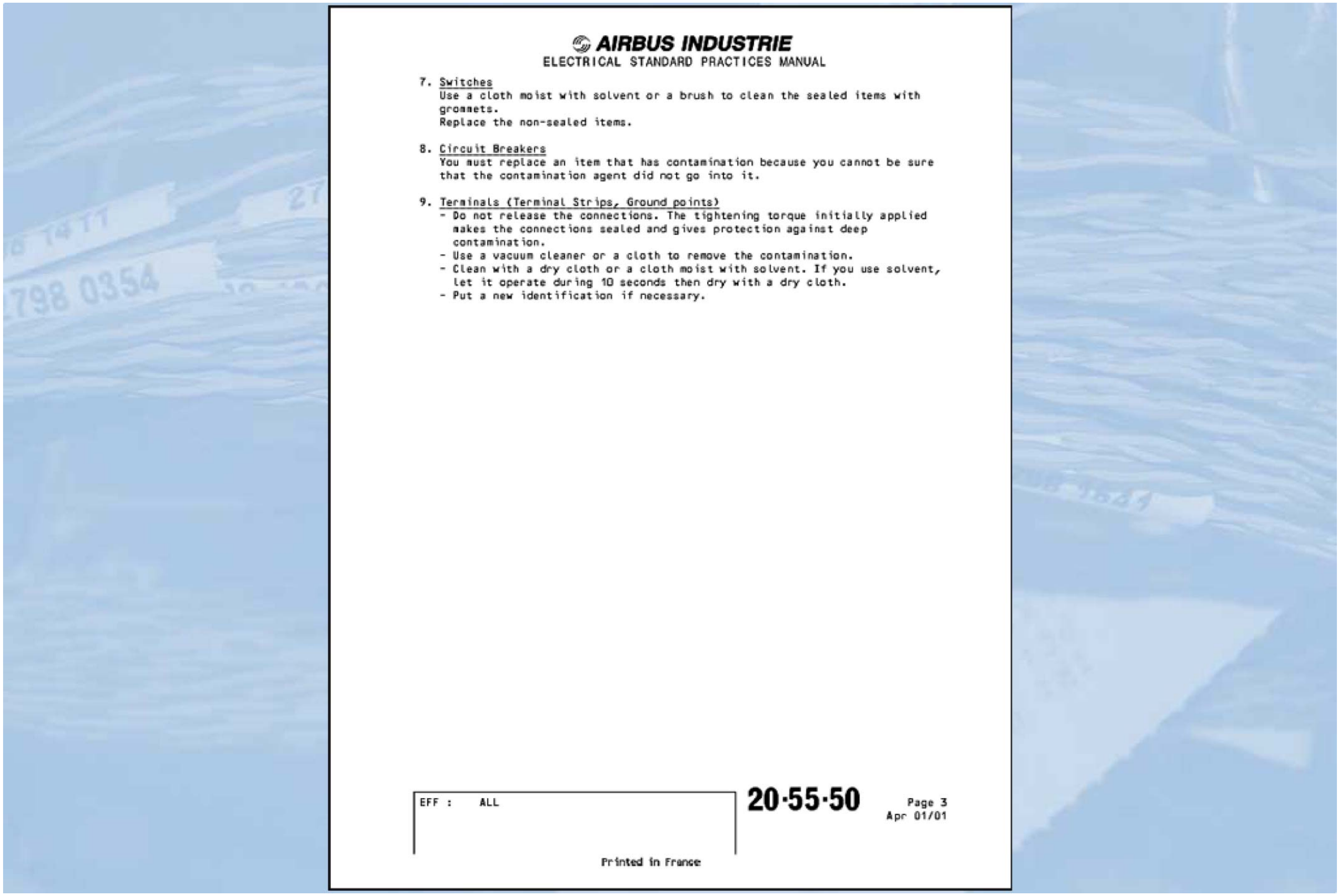

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7. Switches
   Use a cloth moist with solvent or a brush to clean the sealed items with grommets.
   Replace the non-sealed items.

8. Circuit Breakers
   You must replace an item that has contamination because you cannot be sure that the contamination agent did not go into it.

9. Terminals (Terminal Strips, Ground points)
   - Do not release the connections. The tightening torque initially applied makes the connections sealed and gives protection against deep contamination.
   - Use a vacuum cleaner or a cloth to remove the contamination.
   - Clean with a dry cloth or a cloth moist with solvent. If you use solvent, let it operate during 10 seconds then dry with a dry cloth.
   - Put a new identification if necessary.

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KEYWORDS

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I

	MAIN KEY WORD	SECONDARY KEY WORD	TOPIC NUMBER
	Identification	Component	20-32-5X
		Electrical cable	20-32-10
		Items	20-32-5X
		Sleeves	20-42-11
		Sleeves - Allocation Table	20-42-00
	Illuminated	Pushbutton Switch	20-45-11
		Sealed switch	20-45-11
		VU Plugs	20-44-32
	Infrared generators	Tool	20-25-32
	Insertion	Clip	20-25-41
R			
R		Tools for Conduit - Descrition and Procedure	20-25-52
R		Tools for Contacts - Descrition and Procedure	20-25-40
R		Tools for Contacts - Allocation	20-48-xx
R		Tool for Switch - Description	20-25-53
	Insert	Arinc 600	20-44-22
	Inspection	Electrical Checks	20-52-10
	Installation	Backshell	20-51-XX
		Crimp Sleeves	20-42-22
		Stacking of Terminals	20-51-4X
	Insulation	Test	20-52-54
	INSULOCK	Tools	20-25-51

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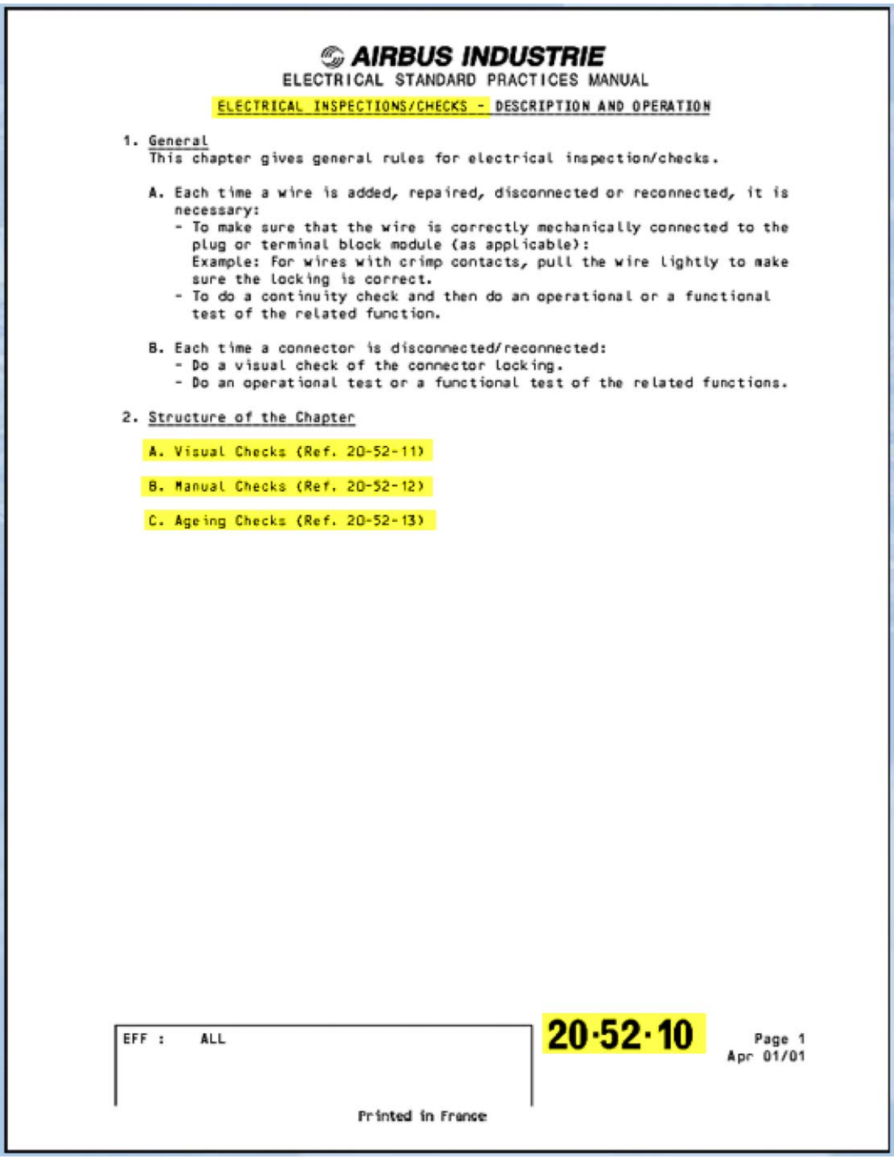

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ELECTRICAL INSPECTIONS/CHECKS - DESCRIPTION AND OPERATION

1. General
This chapter gives general rules for electrical inspection/checks.

A. Each time a wire is added, repaired, disconnected or reconnected, it is necessary:
- To make sure that the wire is correctly mechanically connected to the plug or terminal block module (as applicable):
Example: For wires with crimp contacts, pull the wire lightly to make sure the locking is correct.
- To do a continuity check and then do an operational or a functional test of the related function.

B. Each time a connector is disconnected/reconnected:
- Do a visual check of the connector locking.
- Do an operational test or a functional test of the related functions.

2. Structure of the Chapter

A. Visual Checks (Ref. 20-52-11)

B. Manual Checks (Ref. 20-52-12)

C. Ageing Checks (Ref. 20-52-13)

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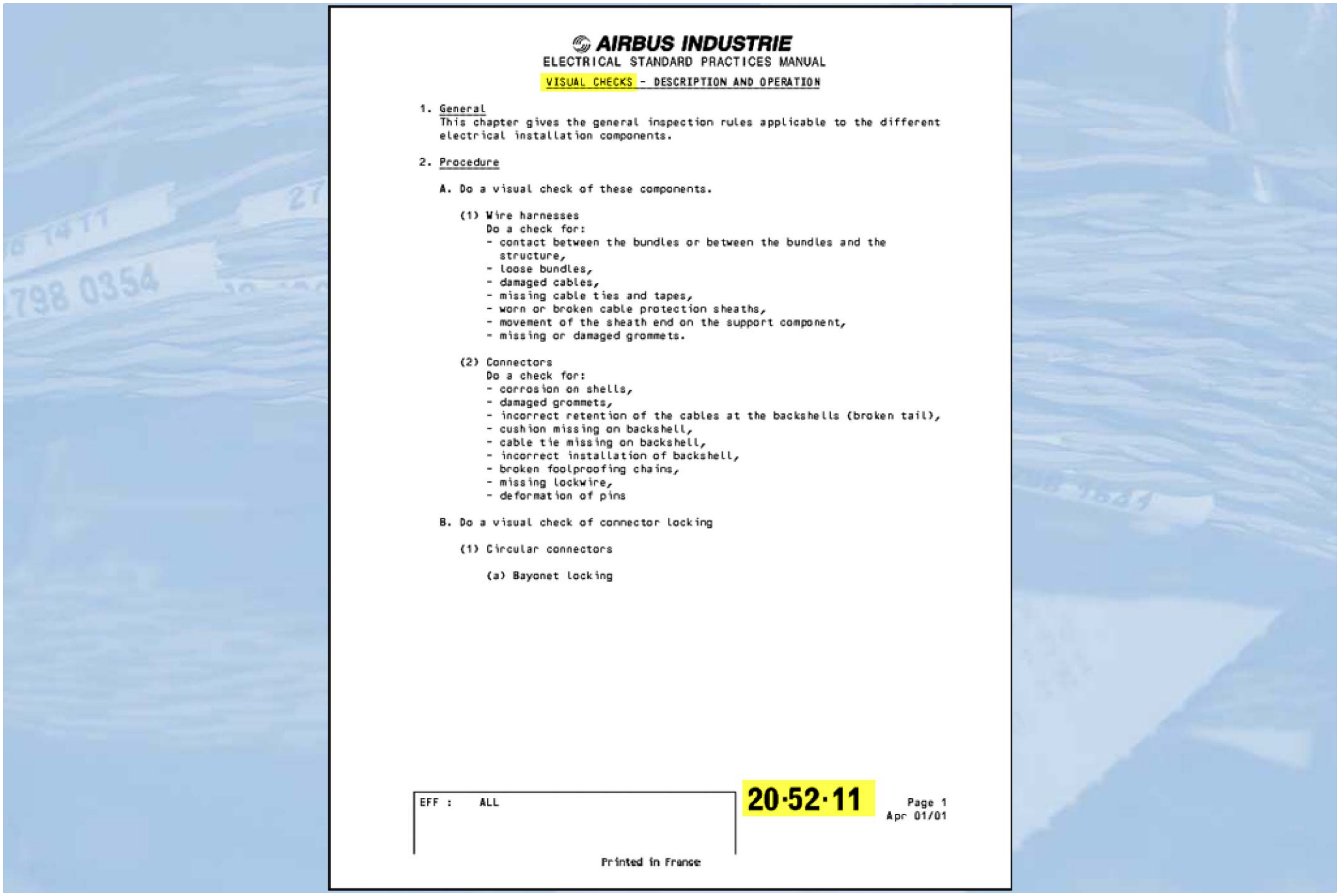

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VISUAL CHECKS - DESCRIPTION AND OPERATION

1. General
   This chapter gives the general inspection rules applicable to the different electrical installation components.

2. Procedure

   A. Do a visual check of these components.

      (1) Wire harnesses
          Do a check for:
          - contact between the bundles or between the bundles and the structure,
          - loose bundles,
          - damaged cables,
          - missing cable ties and tapes,
          - worn or broken cable protection sheaths,
          - movement of the sheath end on the support component,
          - missing or damaged grommets.

      (2) Connectors
          Do a check for:
          - corrosion on shells,
          - damaged grommets,
          - incorrect retention of the cables at the backshells (broken tail),
          - cushion missing on backshell,
          - cable tie missing on backshell,
          - incorrect installation of backshell,
          - broken foolproofing chains,
          - missing lockwire,
          - deformation of pins

   B. Do a visual check of connector locking

      (1) Circular connectors

          (a) Bayonet locking

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P/N	NORM	CHECK
E0052 E0053 E0054	NAS1599 SIMPLIFIED	Make sure that: -You can see the locking studs through the coupling nut -You can hear a "click" at the end of locking.
NSA938026	MIL C 38999 SERIES I	
NSA938027 NSA938028	MIL C 38999 SERIES II	
E0186 E0187	MIL C 38999 SERIES III B	
E0076 E0150	MIL C 26482	

(b) Screw-type locking
(Possibility of wire locking)

P/N	NORM	CHECK
NSA938925 E0111 E0233	MIL C 5015	Make sure that the connector is correctly screwed. Make sure that the lockwire is not broken (if installed)

(c) Screw-type locking and clicker nut

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P/N	NORM	CHECK
E0039 E0040 E0041	NAS1599 SIMPLIFIED	Make sure that you do not see the color band after locking.
E0093 E0094	MIL C 5015	
E0195 E0197	MIL 83723 SERIES III T	
E0320 E0322	MIL 83723 SERIES III T	

(d) Screw-type locking (Self locking)

P/N	NORM	CHECK
E0441 E0442 E0444 E0451 E0452 E0454	MIL 83723 SERIES III T	Make sure that you do not see the color band after locking.
EN 2997	----	

(2) Rectangular connectors

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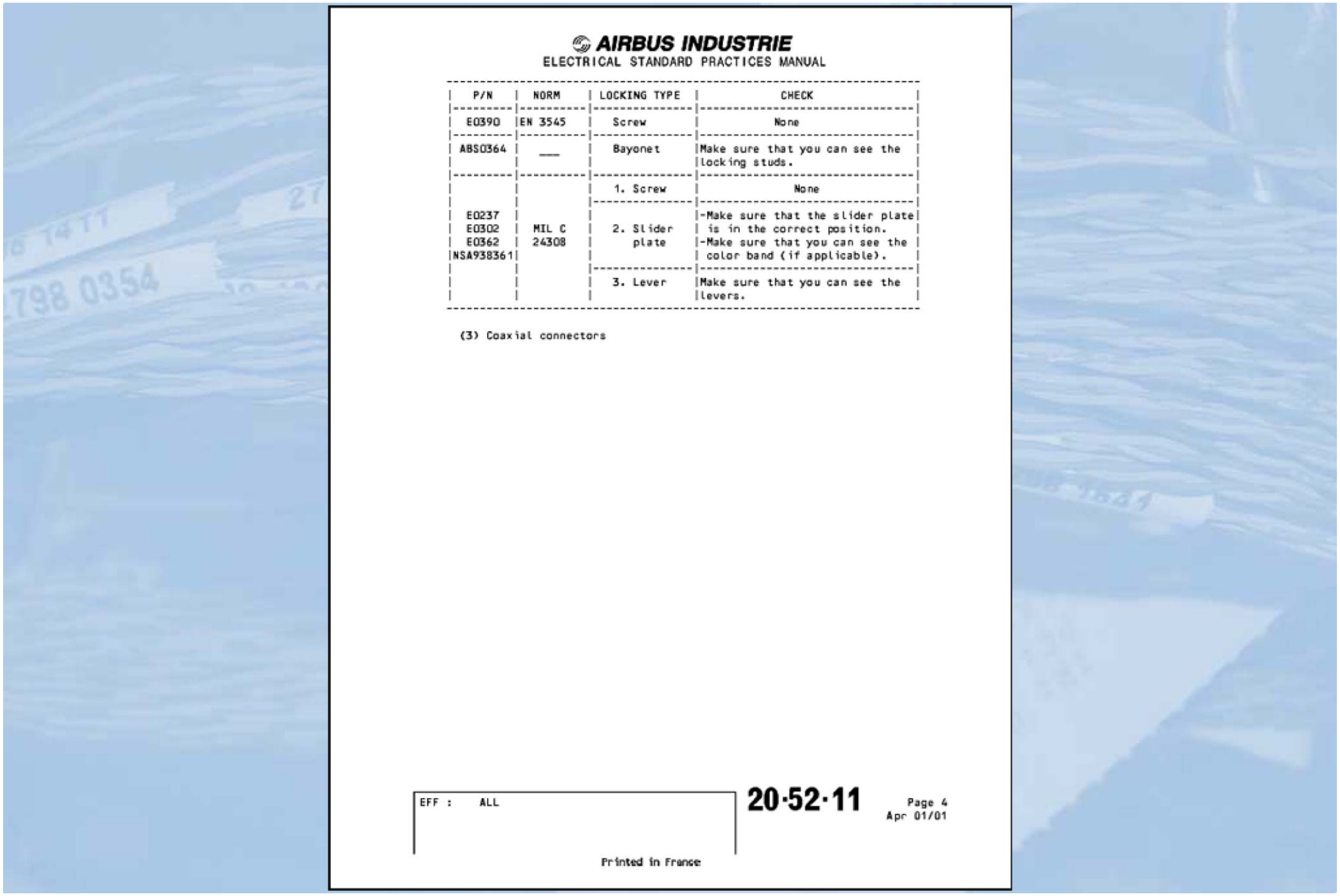

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P/N	NORM	LOCKING TYPE	CHECK
E0390	EN 3545	Screw	None
ABS0364	___	Bayonet	Make sure that you can see the locking studs.
E0237 E0302 E0362 NSA938361	MIL C 24308	1. Screw	None
		2. Slider plate	-Make sure that the slider plate is in the correct position. -Make sure that you can see the color band (if applicable).
		3. Lever	Make sure that you can see the levers.

(3) Coaxial connectors

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P/N and TYPE	LOCKING TYPE	CHECK
E0294 (SMA)	Screw	None
E0295	Bayonet	Make sure that you can see the studs
E0460 (BNC)	Bayonet	
E0461 (TNC)	Screw	None
E0462 (N)	Screw	
E0463 (C)	Bayonet	Make sure that you can see the studs
NSA938601 (BNC)	Bayonet	
NSA938603 (BNC) NSA938604 (BNC)	Bayonet	
NSA938608 (HN)	Screw	None
NSA938621 (TNC)	Screw	
NSA938641 (N)	Screw	
NSA938661 (C)	Bayonet	Make sure that you can see the studs

C. Switches
Do a check of the rear protection cap for damage.

D. Splices and Terminals
Do a check for damage on:
- the insulation,
- the tongue,
- the barrel,
- the retaining sleeve.

E. Ground Points
Make sure that:
- you can see the tightening marks,
- there is no corrosion.

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F. Bonding Braids
Make sure that:
- the bonding braids are in position,
- you can see the tightening marks,
- there is no corrosion on braid wires,
- the braid wires are not broken.

G. Identifications
Make sure that:
- the identifications are in position,
- you can read the markings,
- the identifications are correctly bonded,
- you can see the tightening marks.

H. Wiring Supports or Clamps
Do a check of the general condition:
- presence,
- protection,
- rupture,
- corrosion,
- deformation,
- position,
- attachment (missing or incorrect).

J. Metal Supports - Tubes or Rails
Do a check of the general condition:
- protection (missing or damaged),
- rupture,
- deformation,
- missing attachment.

K. Terminal Blocks
Do a check of the general condition:
- incorrect tightening of terminals,
- damaged dielectric protection.

NOTE : If you find damage during the visual check, it is necessary to repair the defective component(s). Refer to the applicable Repair Processes chapters.

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ELECTRICAL STANDARD PRACTICES MANUAL

MANUAL CHECKS - DESCRIPTION AND OPERATION

1. General
This chapter gives the general inspection checks applicable to the different electrical installation components.

2. Checks
Do a manual check of these components.

A. Dundle attachment

(1) V-supports
Make sure that the size of the support is correct
- if the support is too large, add glass tape ASNA5107 on the periphery of the bundle (2 turns minimum)
- if the support is too small, add a bushing NSA5539 or a round bar (dia. 1.5 mm (0.0590 in.) or 3 mm (0.1181 in.), 20 mm (0.7874 in.) length) at the bottom part of the support.

(2) Clamps
Make sure that the bundle (or the convoluted conduit) does not move in the clamp when you apply a light force to the bundle.

If the bundle moves:
- remove the clamp,
- install a smaller diameter clamp or add glass tape ASNA5107 on the bundle.

If the convoluted conduit moves:
- remove the clamp,
- add glass tape on the conduit,
- install a smaller clamp.

B. Loss of segregation
This can occur when there is extra length on the cable.

(1) EFCS (if installed) or engine parallel routes
Measure the distance between the two routes. The distance must be 25 mm (0.9842 in.) or more at all locations; this includes areas where there is cable deflection.

If the distance is less than 25 mm (0.9842 in.):
- distribute the extra length along the harness, or
- use a sleeve ABS0596 on one of the two routes, attached with cable ties NSA935401 at level of the non-conformity.
(Ref. Fig. 001)

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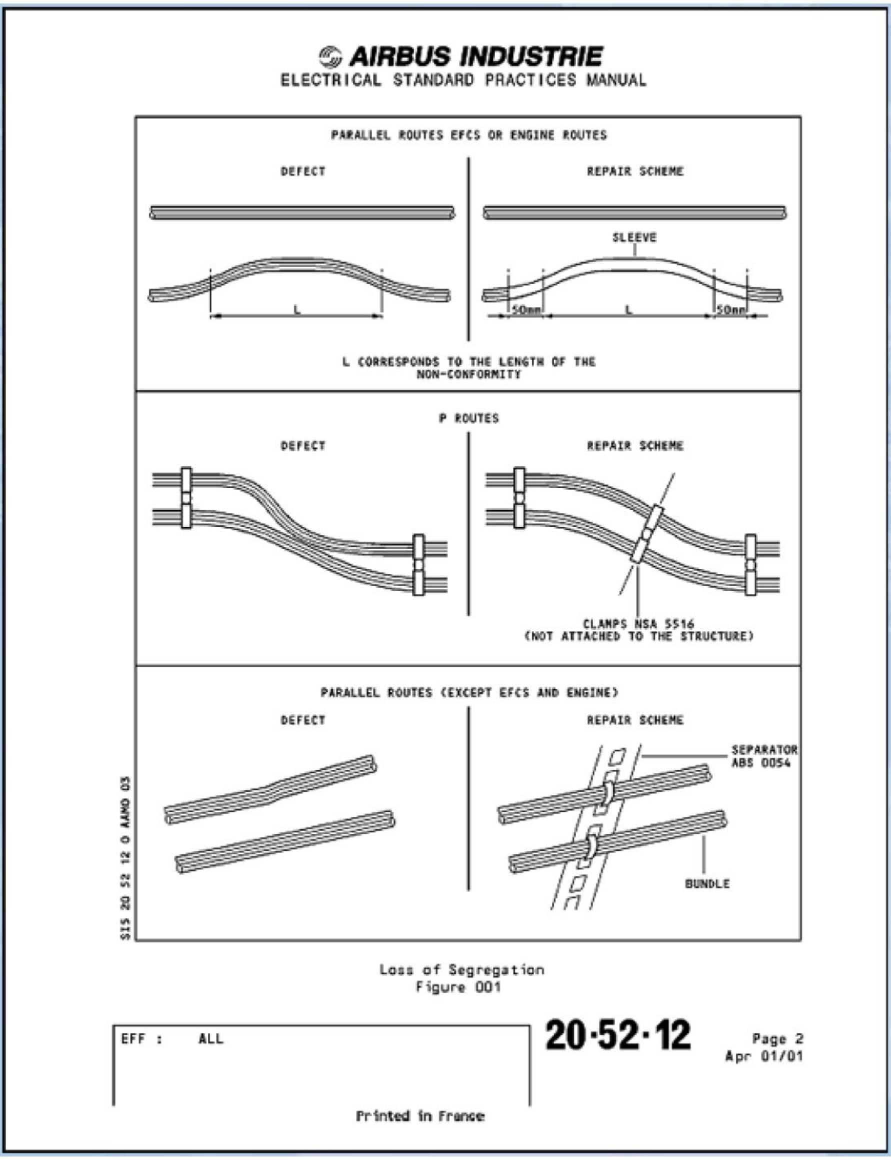
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PARALLEL ROUTES EFCS OR ENGINE ROUTES
DEFECT
REPAIR SCHEME
SLEEVE
L
50mm
50mm
L CORRESPONDS TO THE LENGTH OF THE NON-CONFORMITY
P ROUTES
DEFECT
REPAIR SCHEME
CLAMPS NSA 5516
(NOT ATTACHED TO THE STRUCTURE)
PARALLEL ROUTES (EXCEPT EFCS AND ENGINE)
DEFECT
REPAIR SCHEME
SEPARATOR ABS 0054
BUNDLE
S15 20 52 12 0 AAM0 03
Loss of Segregation
Figure 001
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(2) Parallel routes other than EFCS (if installed) or engine
Measure the distance between the two routes. The distance must be 25 mm (0.9842 in.) or more at all locations; this includes areas where there is cable deflection.

If the distance is less than 25 mm (0.9842 in.):
- distribute the extra length along the harness, or
- add a spacer ABS0054 attached with cable ties
(Ref. Fig. 001)

(3) EFCS (if installed) or engine perpendicular routes
Measure the distance between the two routes. The distance must be 25 mm (0.9842 in.) or more at all locations; this includes areas where there is cable deflection.

If the distance is less than 25 mm (0.9842 in.):
- distribute the extra length along the harness, or
- use a sleeve ABS0596 on one of the two routes , attached with cable ties.
(Ref. Fig. 002)

(4) Parallel routes other than EFCS (if installed) or engine
Measure the distance between the two routes. the distance must be 25 mm (0.9842 in.) or more at all locations; this includes areas where there is cable deflection.

If the distance is less than 25 mm (0.9842 in.):
- distribute the extra length along the harness, or
- use a spacer NSA5527 on one of the two routes, attached with a cable tie.
(Ref. Fig. 001)

(5) P Routes
The measured distance between the two routes must be more than 25 mm (0.9842 in.)

If the distance is less than 25 mm (0.9842 in.):
- add clamps NSA5516 installed head-to-tail
(Ref. Fig. 001)

C. Mechanical Interfaces

(1) Bundle routed above or below an obstacle
Measure the distance between the bundle and the obstacle. The distance must be more than:
- 10 mm (0.3937 in.) if the bundle is routed above the obstacle
- 5 mm (0.1968 in.) if the bundle is routed below the obstacle

EFF : ALL

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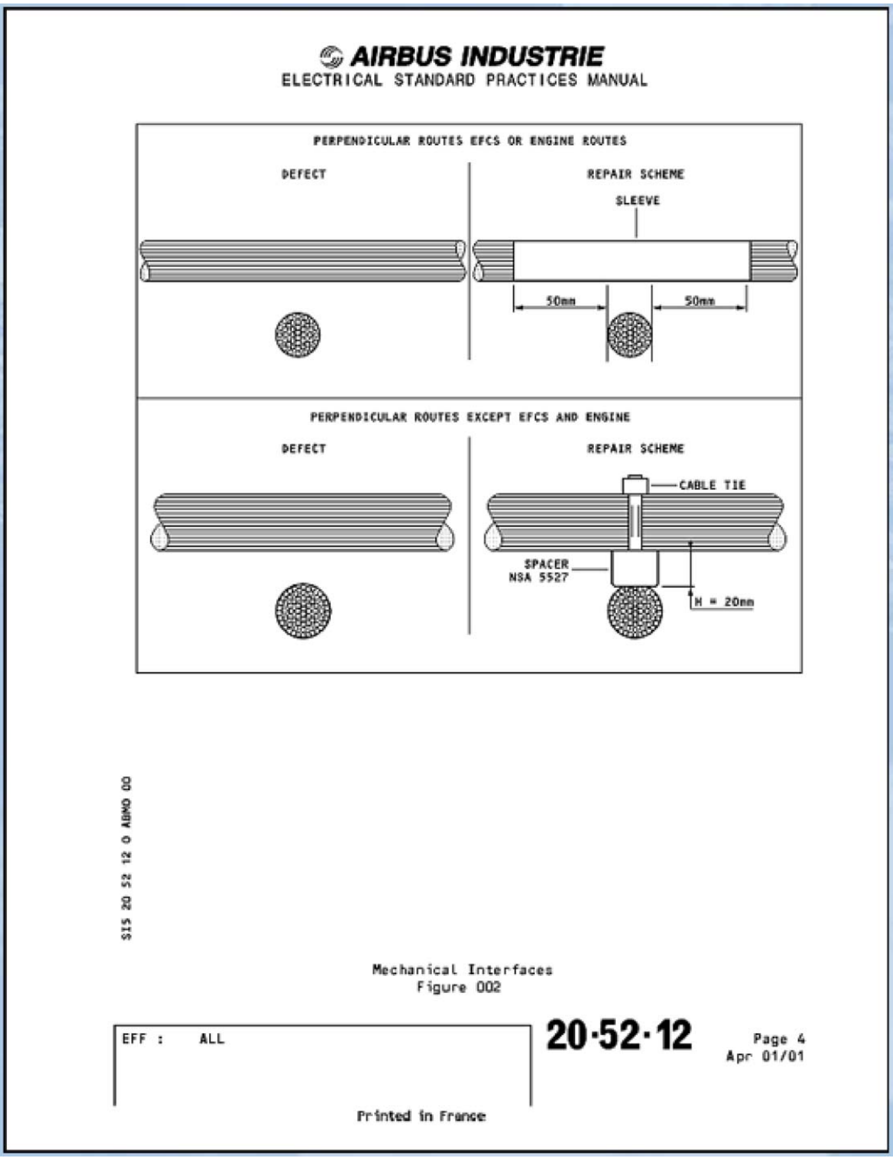

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Mechanical Interfaces
Figure 002

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If the distance is less than these values:
- Apply teflon adhesive tape on the structure.

(2) Bundle at level of a fixed clamp
(Ref. Fig. 003)
Measure the distance between the bundle and the obstacle. The distance must be more than 5 mm (0.1968 in.).

If the distance is less than 5 mm (0.1968 in.):
- Apply teflon adhesive tape on the structure.

(3) Bundle routed through a structure hole
(Ref. Fig. 003)
Measure the distances D1 and D2 between the bundle and the struture. D1 must be more than 20 mm (0.7874 in.) and D2 must be more than 15 mm (0.5905 in.).

If the distances are less than these values, install a protection on the edge of the hole with silicone extrusion NSA360002 or equivalent.

NOTE : If you cannot use the methods given in steps (1), (2) and (3) for the protection of the structure, do these steps:
In the pressurized zones:
- protect the bundle with a velcro sleeve NSA0507 attached with cable ties.
In the non-pressurized zones:
- protect the bundle with a split sleeve attached with cable ties.

(4) Bundle attached with a movable clamp
Measure the distance between the bundle and the structure. The distance must be more than 10 mm (0.3937 in.).

If the distance is less than 10 mm (0.3937 in.):
- turn the clamp to a different direction to prevent interference with the structure;
- distribute the extra length.
If you cannot do these steps, protect the structure with teflon adhesive tape.

(5) Loose conduits that touch the structure or another component
(Ref. Fig. 004)

Measure the distance between the conduit and the structure. The distance must be more than or equal to 10 mm (0.3937 in.).

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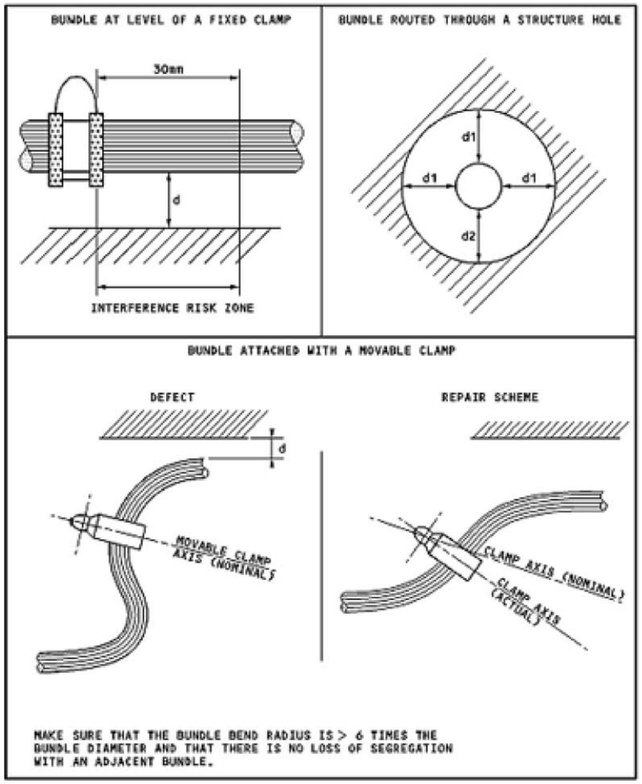

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Mechanical Interfaces
Figure 003

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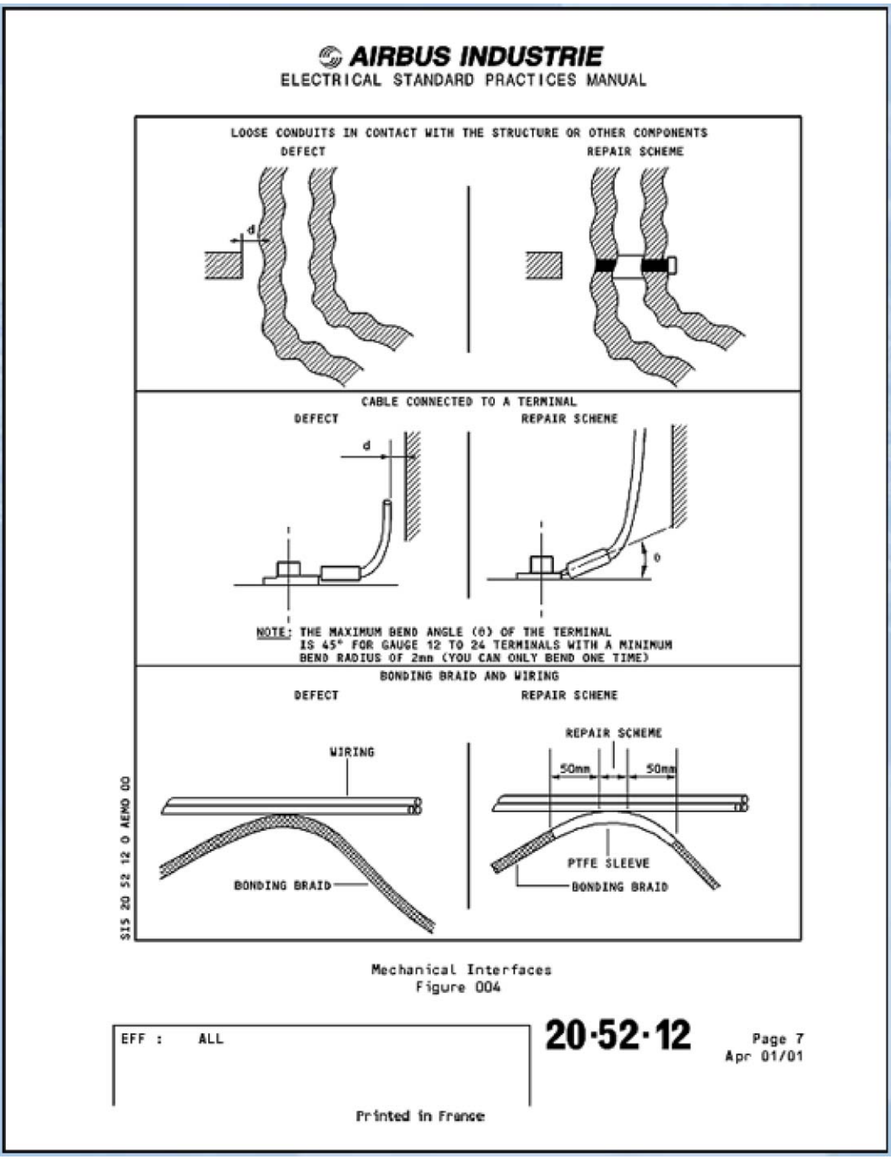

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LOOSE CONDUITS IN CONTACT WITH THE STRUCTURE OR OTHER COMPONENTS
DEFECT
REPAIR SCHEME
d

CABLE CONNECTED TO A TERMINAL
DEFECT
REPAIR SCHEME
d
θ

NOTE: THE MAXIMUM BEND ANGLE (θ) OF THE TERMINAL IS 45° FOR GAUGE 12 TO 24 TERMINALS WITH A MINIMUM BEND RADIUS OF 2mm (YOU CAN ONLY BEND ONE TIME)

BONDING BRAID AND WIRING
DEFECT
REPAIR SCHEME
WIRING
BONDING BRAID
REPAIR SCHEME
50mm
50mm
PTFE SLEEVE
BONDING BRAID

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Mechanical Interfaces
Figure 004

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If the distance is less than 10 mm (0.3937 in.), attach the conduits together with a tie NSA935401 and install a block NSA5586 to prevent rubbing.

(6) Cable connected to a terminal
Measure the distance between the terminal and the structure. The distance must be more than 10 mm (0.3937 in.).

If the distance is less than 10 mm (0.3937 in.) , change the direction of the terminal to prevent a possible interference with the structure.

If you cannot do this step, bend the terminal
(Ref. Fig. 004)

(7) Bonding braid and wiring
Make sure that the bonding braid does not touch the wiring. If it does, turn the braid terminal to prevent interference between the bonding braid and the wiring.

NOTE : Do not use this repair procedure for the braids that move.

If you cannot do this step, add a PTFE heat-shrink sleeve NSA937210 to the bonding braid.

D. Defective length

(1) Extra length on technical and standard cabin furnishings harnesses
The cable extra length is necessary for:
- connector removal/installation
- contact locking/unlocking
- drip loop.
The extra length must be between 30 mm (1.1811 in.) and 50 mm (1.9685 in.) . If the extra length is more than 50 mm (1.9685 in.) , distribute the length along the harness to get the 50 mm (1.9685 in.) value.
If you cannot distribute the extra length along the harness, cut the harness to the required length.

(2) Extra length on "version" cabin furnishings harnesses
For these harnesses, the extra length is sufficient to adapt to different versions of cabin layout.
If the extra length is more than 50 mm (1.9685 in.) , make a loop and if necessary, install a dual support.

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E. Braided sheaths
Move your hand along the sheath to find broken braid wires.
A maximum number of 3 broken wires is permitted. If more, change the sheath.

F. Connectors

(1) To prevent contact deterioration when you connect the plug connectors, push the dummy contacts to make sure that they are engaged correctly.

(2) Make sure that the contacts are correctly locked in the cavities by lighthy pulling the cable rearwards.
No significant movement must be felt.

(3) Make sure the connector backshell is correctly installed by lightly pulling the locking wire (if installed)
No significant movement must be felt.

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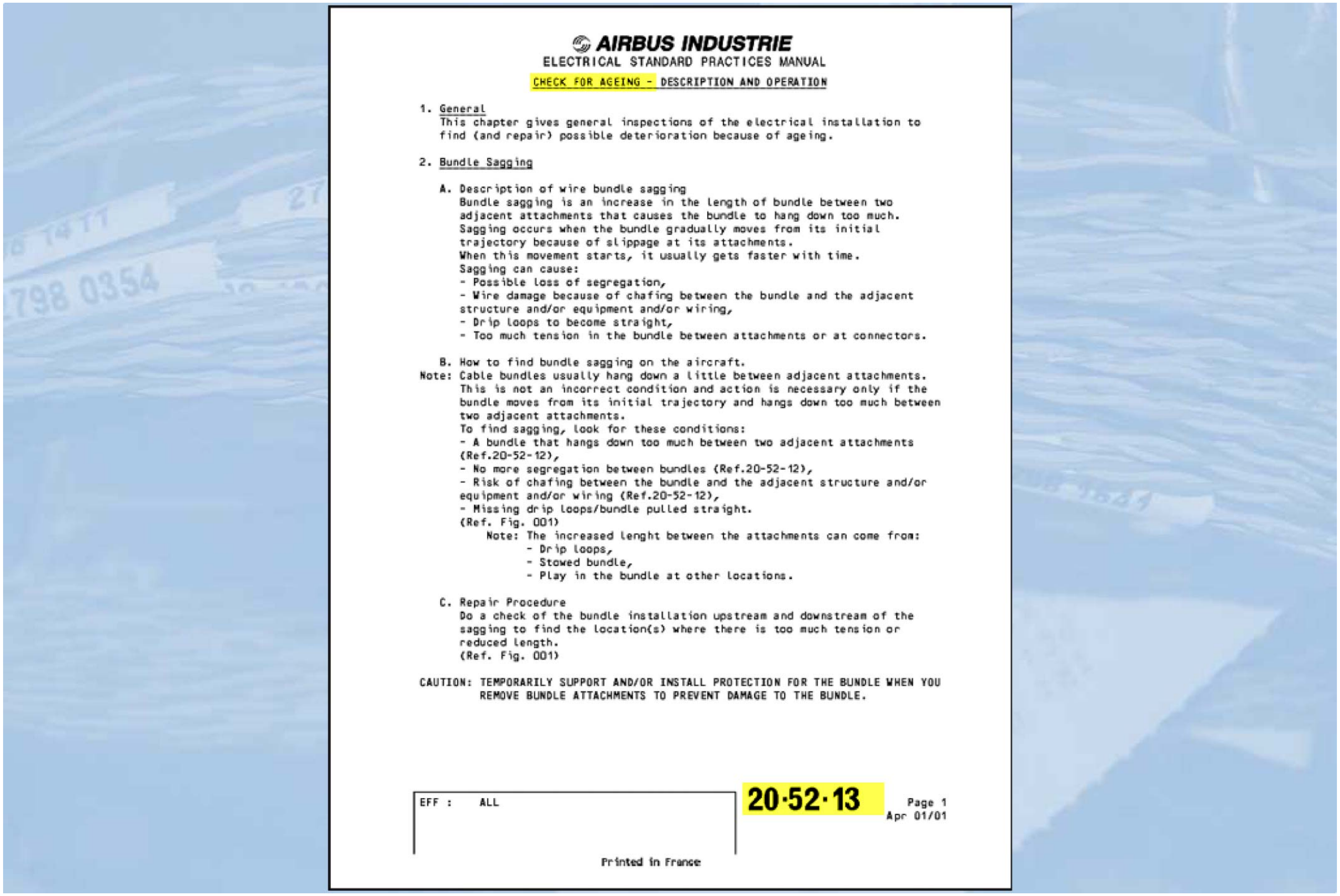

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CHECK FOR AGEING - DESCRIPTION AND OPERATION

1. General
   This chapter gives general inspections of the electrical installation to find (and repair) possible deterioration because of ageing.

2. Bundle Sagging

   A. Description of wire bundle sagging
      Bundle sagging is an increase in the length of bundle between two adjacent attachments that causes the bundle to hang down too much.
      Sagging occurs when the bundle gradually moves from its initial trajectory because of slippage at its attachments.
      When this movement starts, it usually gets faster with time.
      Sagging can cause:
      - Possible loss of segregation,
      - Wire damage because of chafing between the bundle and the adjacent structure and/or equipment and/or wiring,
      - Drip loops to become straight,
      - Too much tension in the bundle between attachments or at connectors.

   B. How to find bundle sagging on the aircraft.

Note: Cable bundles usually hang down a little between adjacent attachments. This is not an incorrect condition and action is necessary only if the bundle moves from its initial trajectory and hangs down too much between two adjacent attachments.
      To find sagging, look for these conditions:
      - A bundle that hangs down too much between two adjacent attachments (Ref.20-52-12),
      - No more segregation between bundles (Ref.20-52-12),
      - Risk of chafing between the bundle and the adjacent structure and/or equipment and/or wiring (Ref.20-52-12),
      - Missing drip loops/bundle pulled straight.
      (Ref. Fig. 001)
      Note: The increased lenght between the attachments can come from:
      - Drip loops,
      - Stowed bundle,
      - Play in the bundle at other locations.

   C. Repair Procedure
      Do a check of the bundle installation upstream and downstream of the sagging to find the location(s) where there is too much tension or reduced length.
      (Ref. Fig. 001)

CAUTION: TEMPORARILY SUPPORT AND/OR INSTALL PROTECTION FOR THE BUNDLE WHEN YOU REMOVE BUNDLE ATTACHMENTS TO PREVENT DAMAGE TO THE BUNDLE.

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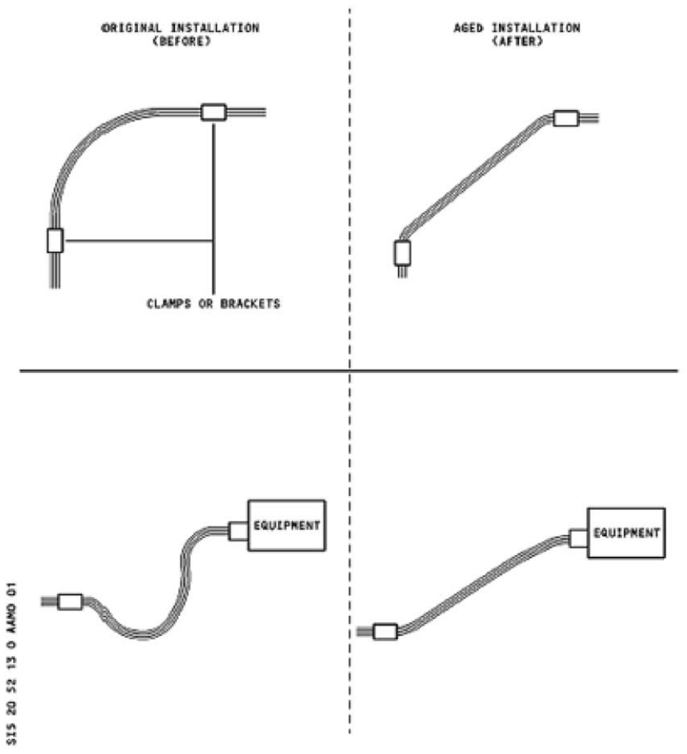
EXAMPLES OF REDUCED LENGTH/EXCESSIVE TENSION



Check For Ageing - Reduced length or exessive tension example
Figure 001

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Remove all the bundle attachments between the sagging and the location(s) of reduced length/too much tension.
Re-distribute the sagged length to the location of the excessive tension/reduced length.
Adjust the bundle and do a check for.
- Loss of segregation,
- Risk of chafing,
- Too much tension,
- Presence of drip loops,

Adjust the bundle again if necessary,
Install self adhesive tape ASNA5107 (Ref. process described below) at the locations of all removed attachments,
Install the bundle attachments, (Ref. procedure below).

Note: For correct attachment, the internal diameter of the attachment, to be installed must be slightly smaller than the diameter of the bundle with its adhesive tape.

Pull lightly on the bundle to make sure that it is correctly attached.

CAUTION: IT IS NECESSARY TO PULL FIRMLY ON THE TAPE DURING ALL THE BELOW DESCRIBED TAPE INSTALLATION PROCESS TO ENSURE A GOOD TIGHTENING OF THE TAPE ON THE BUNDLE.

D. ASNA5107 Self Adhesive Tape Installation Procedure.

(1) General Procedure
- Remove all cable ties or lacing tape at all securing locations over a lenght of 50 to 60 mm on each side of the attachment.
- Insert one end of a piece of self adhesive tape ASNA5107 through the bundle to separate the bundle in 2 equal parts .
(Ref. Fig. 002)
The tape must come out of the bundle by 10 to 20 mm.
- Pull firmly on the tape and wrap it around the bundle.
NOTE: The first wrap and the last wrap must have a 100% overlap. The other wraps must have a 50% overlap.
- Attach the two ends of the tape with cable ties NSA935401.
(Ref. Fig. 003)
- Install all the removed cable ties.

(2) Procedure for an over-lenght stowage loop
(Ref. Fig. 004)
- Remove all cable ties or lacing tape on the over-length part of the bundle.
- Make a loop to stow the bundle over-length.
- At the location where the loop touches the bundle, insert one end of the adhesive tape between the two parts of the bundle.
- Install two cable ties NSA935401 at each side of the location of the adhesive tape.
- Pull firmly on the tape and wrap it around the bundle.

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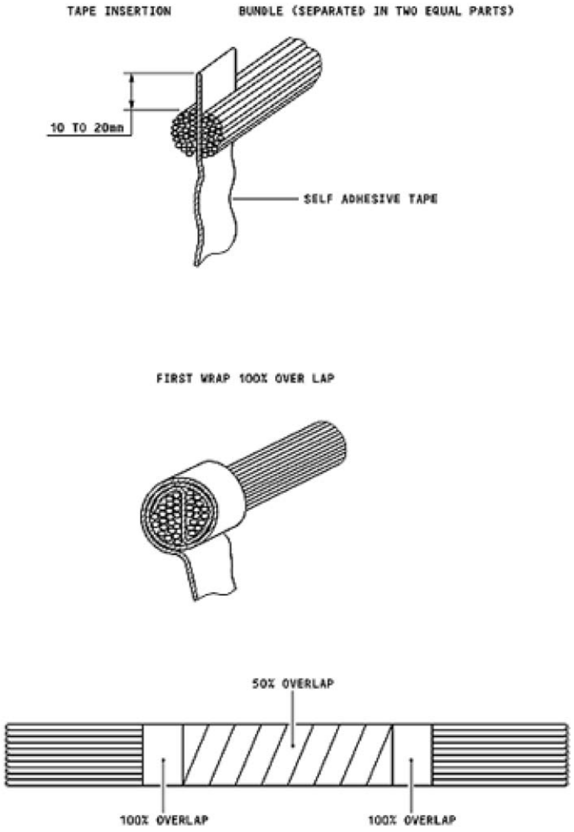

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Check for ageing - Installation of Adhesive Tape
Figure 002

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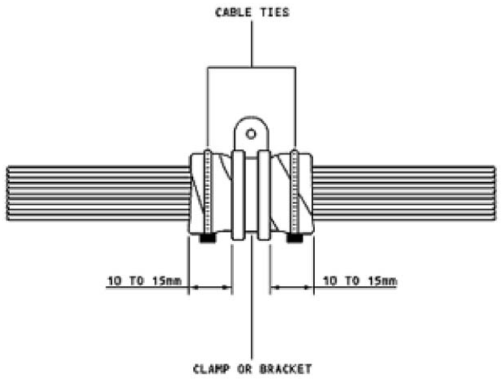

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Check for ageing - Installation of Bundle Attachment
Figure 003

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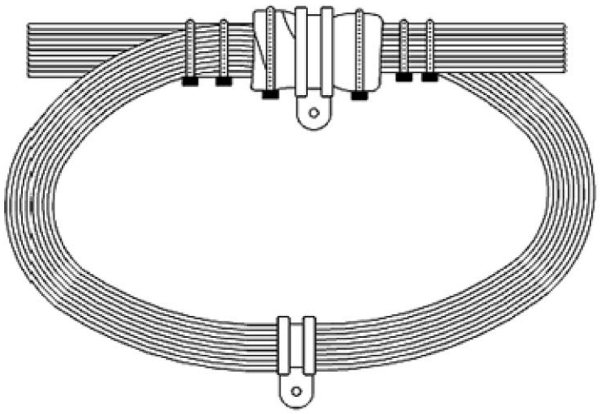
OVERLENGTH STORAGE SECURING PROCESS



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Check for ageing - Overlength Storage Loop
Figure 004

INSPECTION

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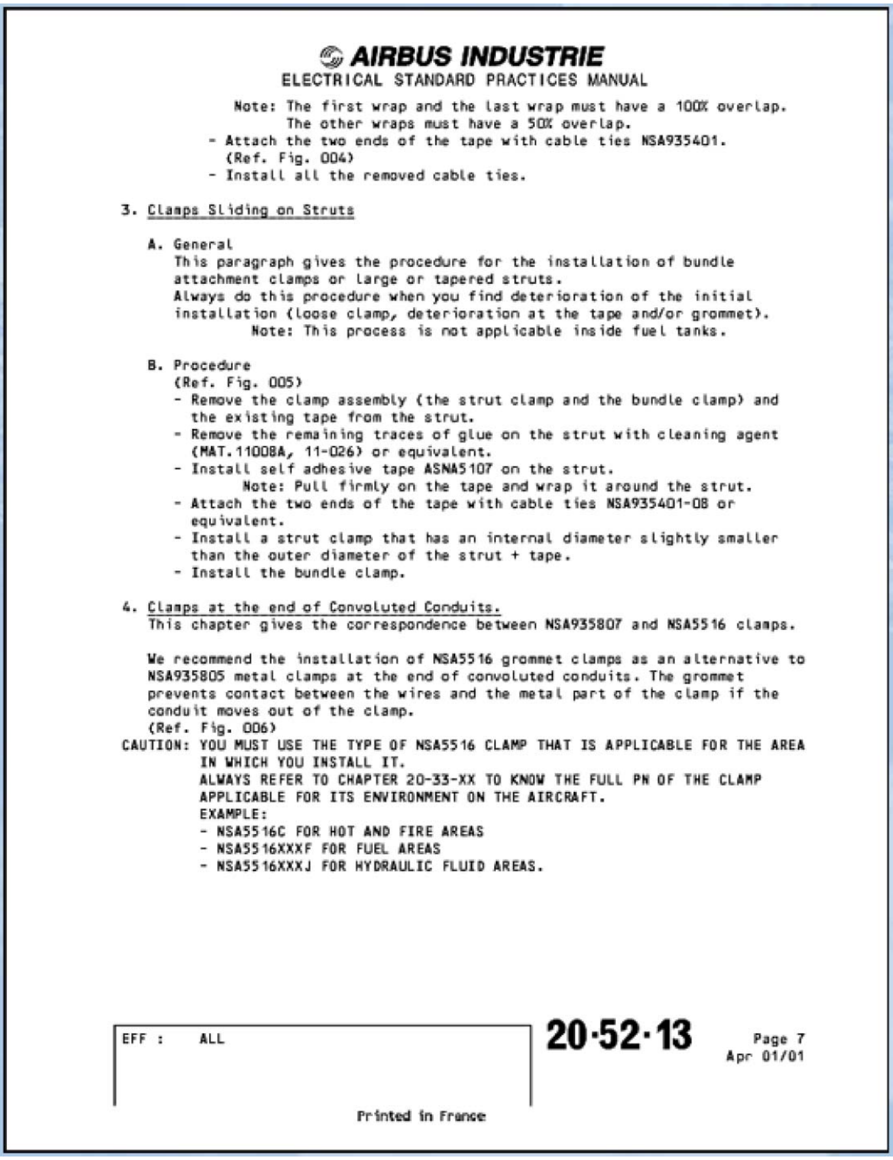

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Note: The first wrap and the last wrap must have a 100% overlap.
The other wraps must have a 50% overlap.
- Attach the two ends of the tape with cable ties NSA935401.
(Ref. Fig. 004)
- Install all the removed cable ties.

3. Clamps Sliding on Struts

A. General
This paragraph gives the procedure for the installation of bundle attachment clamps on large or tapered struts.
Always do this procedure when you find deterioration of the initial installation (loose clamp, deterioration at the tape and/or grommet).
Note: This process is not applicable inside fuel tanks.

B. Procedure
(Ref. Fig. 005)
- Remove the clamp assembly (the strut clamp and the bundle clamp) and the existing tape from the strut.
- Remove the remaining traces of glue on the strut with cleaning agent (MAT.11008A, 11-026) or equivalent.
- Install self adhesive tape ASNA5107 on the strut.
Note: Pull firmly on the tape and wrap it around the strut.
- Attach the two ends of the tape with cable ties NSA935401-08 or equivalent.
- Install a strut clamp that has an internal diameter slightly smaller than the outer diameter of the strut + tape.
- Install the bundle clamp.

4. Clamps at the end of Convoluted Conduits.
This chapter gives the correspondence between NSA935807 and NSA5516 clamps.

We recommend the installation of NSA5516 grommet clamps as an alternative to NSA935805 metal clamps at the end of convoluted conduits. The grommet prevents contact between the wires and the metal part of the clamp if the conduit moves out of the clamp.
(Ref. Fig. 006)
CAUTION: YOU MUST USE THE TYPE OF NSA5516 CLAMP THAT IS APPLICABLE FOR THE AREA IN WHICH YOU INSTALL IT.
ALWAYS REFER TO CHAPTER 20-33-XX TO KNOW THE FULL PN OF THE CLAMP APPLICABLE FOR ITS ENVIRONMENT ON THE AIRCRAFT.
EXAMPLE:
- NSA5516C FOR HOT AND FIRE AREAS
- NSA5516XXXF FOR FUEL AREAS
- NSA5516XXXJ FOR HYDRAULIC FLUID AREAS.

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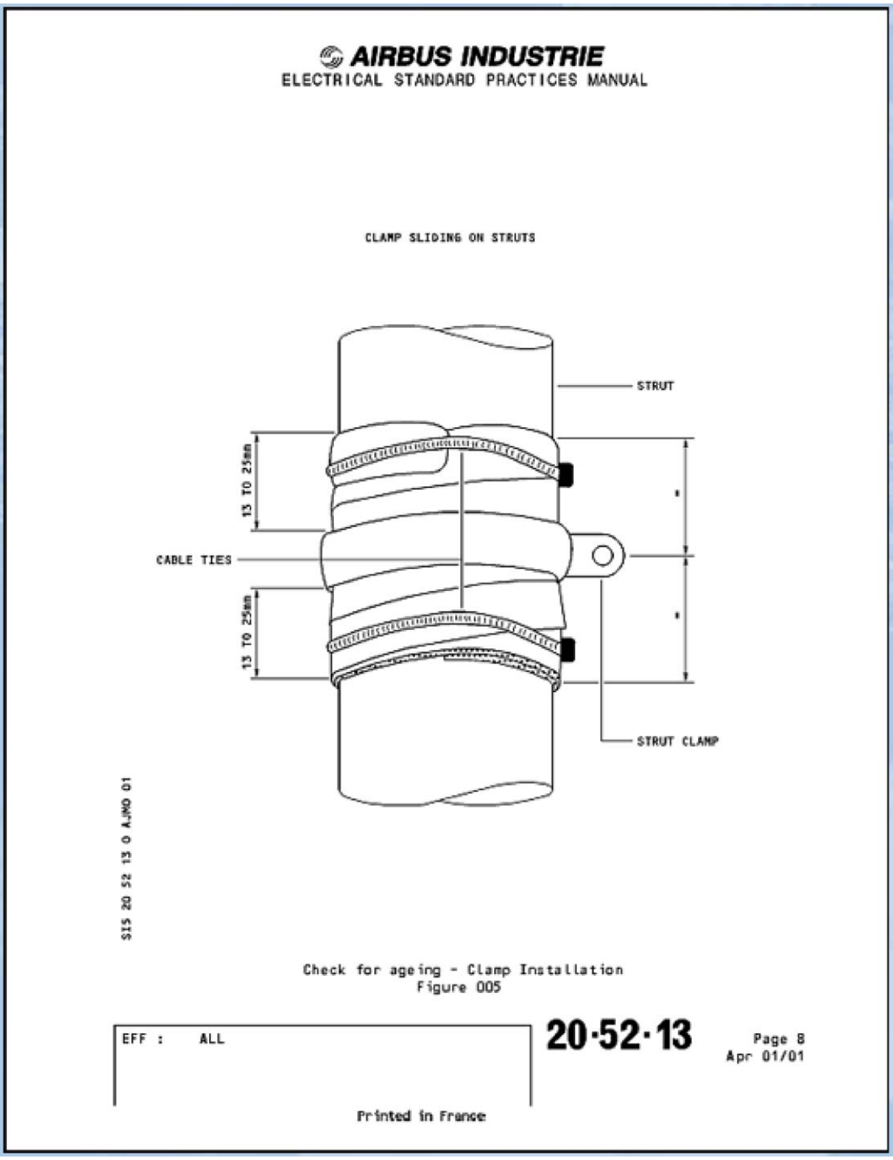
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CLAMP SLIDING ON STRUTS

Check for ageing - Clamp Installation
Figure 005

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CONVOLUTED CONDUIT			METAL CLAMP			GROMMET CLAMP			
PN	REP. DIA.	EXT. DIA.	PN	REP. DIA.	INT. DIA.	PN	REP. DIA.	GROMMET MATERIAL	INT. DIA.
NSA935805- NSA935805-	02 02	4 4	NSA935807- NSA935807C	02 02	3,8 3,8	NSA5516 NSA5516C	03N 03N	D OR F OR J D OR F OR J	4 4
NSA935805- NSA935805-	03 03	4,7 4,7	NSA935807- NSA935807C	03 03	4,2 4,2	NSA5516 NSA5516C	04N 04N	D OR F OR J D OR F OR J	5 5
NSA935805- NSA935805-	04 04	5,5 5,5	NSA935807- NSA935807C	04 04	5,2 5,2	NSA5516 NSA5516C	04N 04N	D OR F OR J D OR F OR J	5 5
NSA935805- NSA935805-	06 06	8,1 8,1	NSA935807- NSA935807C	06 06	8 8	NSA5516 NSA5516C	07N 07N	D OR F OR J D OR F OR J	7 7
NSA935805- NSA935805-	09 09	10,6 10,6	NSA935807- NSA935807C	09 09	10,5 10,5	NSA5516 NSA5516C	10N 10N	D OR F OR J D OR F OR J	9,5 9,5
NSA935805- NSA935805-	10 10	11,4 11,4	NSA935807- NSA935807C	10 10	11 11	NSA5516 NSA5516C	12N 12N	D OR F OR J D OR F OR J	11 11
NSA935805- NSA935805-	12 12	13 13	NSA935807- NSA935807C	12 12	12,7 12,7	NSA5516 NSA5516C	13N 13N	D OR F OR J D OR F OR J	12 12
NSA935805- NSA935805-	14 14	14,6 14,6	NSA935807- NSA935807C	14 14	14,2 14,2	NSA5516 NSA5516C	15N 15N	D OR F OR J D OR F OR J	14 14
NSA935805- NSA935805-	16 16	16,2 16,2	NSA935807- NSA935807C	16 16	16 16	NSA5516 NSA5516C	17N 17N	D OR F OR J D OR F OR J	15 15
NSA935805- NSA935805-	20 20	19,5 19,5	NSA935807- NSA935807C	20 20	19 19	NSA5516 NSA5516C	22N 22N	D OR F OR J D OR F OR J	19 19
NSA935805- NSA935805-	24 24	23,5 23,5	NSA935807- NSA935807C	24 24	23 23	NSA5516 NSA5516C	26N 26N	D OR F OR J D OR F OR J	23 23
NSA935805- NSA935805-	28 28	27,5 27,5	NSA935807- NSA935807C	28 28	27 27	NSA5516 NSA5516C	30N 30N	D OR F OR J D OR F OR J	27 27
NSA935805- NSA935805-	32 32	31,3 31,3	NSA935807- NSA935807C	32 32	30 30	NSA5516 NSA5516C	33N 33N	D OR F OR J D OR F OR J	30 30
NSA935805- NSA935805-	40 40	38,9 38,9	NSA935807- NSA935807C	40 40	38 38	NSA5516 NSA5516C	41N 41N	D OR F OR J D OR F OR J	38 38
NSA935805- NSA935805-	48 48	45,5 45,5	NSA935807- NSA935807C	/ /	/ /	NSA5516 NSA5516C	47N 47N	D OR F OR J D OR F OR J	45 45

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Check for ageing - Alternative Clamps
Figure 006

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KEYWORDS

REPAIR

REPAIR BY SPLICE
STEP1: Selection of the repair and the splice
REPAIR BY SPLICE
STEP2: Information on the tools to make the splice
REPAIR BY SPLICE
STEP3: Deeper information on the crimping tool

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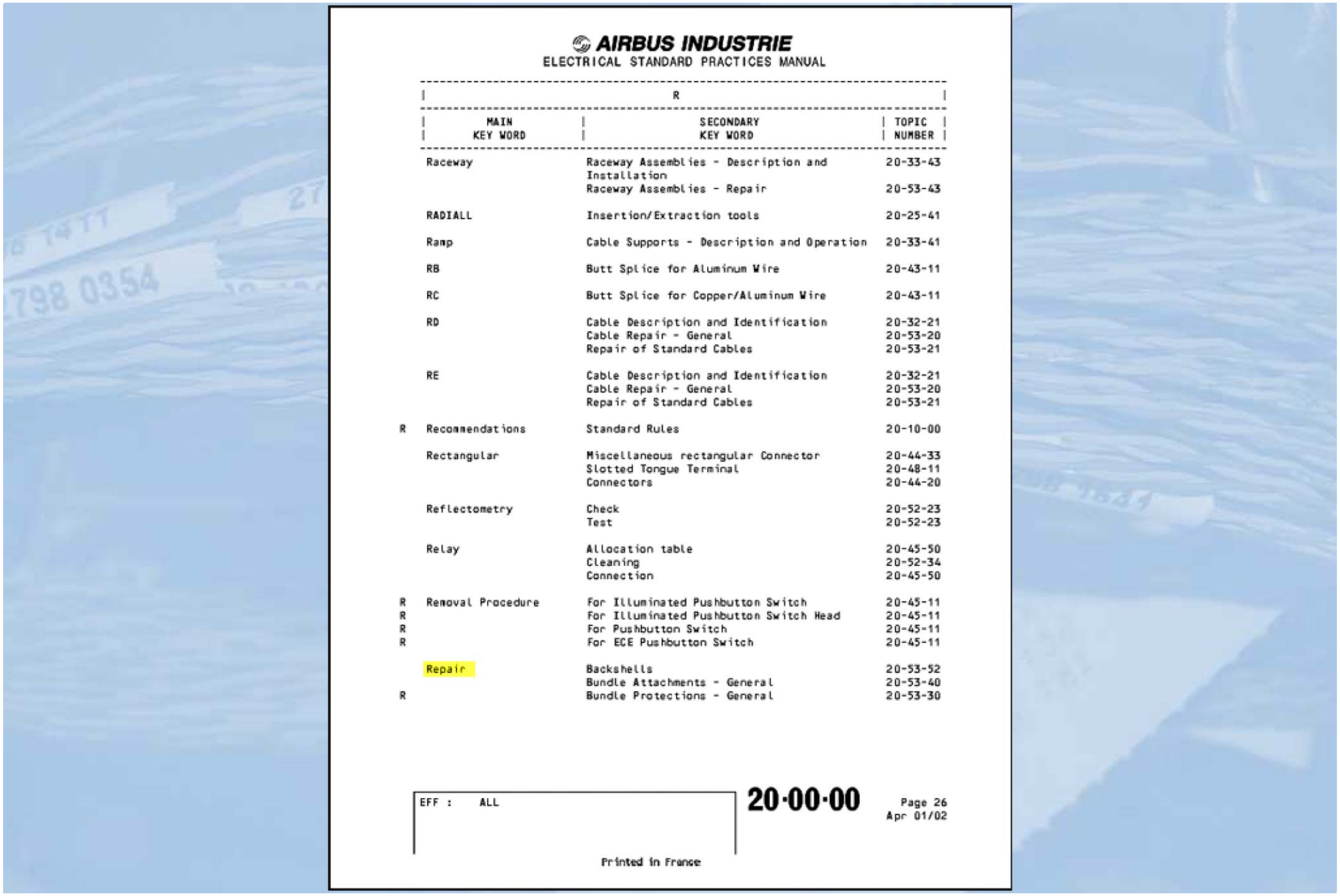

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R

	MAIN KEY WORD	SECONDARY KEY WORD	TOPIC NUMBER
	Raceway	Raceway Assemblies - Description and Installation	20-33-43
		Raceway Assemblies - Repair	20-53-43
	RADIALL	Insertion/Extraction tools	20-25-41
	Ramp	Cable Supports - Description and Operation	20-33-41
	RB	Butt Splice for Aluminum Wire	20-43-11
	RC	Butt Splice for Copper/Aluminum Wire	20-43-11
	RD	Cable Description and Identification	20-32-21
		Cable Repair - General	20-53-20
		Repair of Standard Cables	20-53-21
	RE	Cable Description and Identification	20-32-21
		Cable Repair - General	20-53-20
		Repair of Standard Cables	20-53-21
R	Recommendations	Standard Rules	20-10-00
	Rectangular	Miscellaneous rectangular Connector	20-44-33
		Slotted Tongue Terminal	20-48-11
		Connectors	20-44-20
	Reflectometry	Check	20-52-23
		Test	20-52-23
	Relay	Allocation table	20-45-50
		Cleaning	20-52-34
		Connection	20-45-50
R	Removal Procedure	For Illuminated Pushbutton Switch	20-45-11
R		For Illuminated Pushbutton Switch Head	20-45-11
R		For Pushbutton Switch	20-45-11
R		For ECE Pushbutton Switch	20-45-11
	Repair	Backshells	20-53-52
		Bundle Attachments - General	20-53-40
R		Bundle Protections - General	20-53-30

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REPAIR

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REPAIR OF STANDARD CABLES - DESCRIPTION AND OPERATION

1. General

This chapter gives the technical requirements for repair of the cables:

- Single-Core Cables for Panels and Boxes, Low-Temperature200 deg.C (392.00 deg.F)
  These cables found only in panels or in boxes have P/Ns:
  E0260 BF
  NSA935041 BE

- Single-Core or Multi-Core Cables, Unscreened, Low-Temperature200 deg.C (392.00 deg.F)
  These cables installed on aircraft have P/Ns:
  E0261 CF/CF-C/CF-U
  E0264 PF
  E0266 QF
  E0268 RF
  NSA935012 AK/AKA/AKB
  NSA935246 PD
  NSA935388 QD
  NSA935393 RD

- Single-Core or Multi-Core Cables, Unscreened, High-Temperature260 deg.C (500.00 deg.F)
  These cables installed on aircraft have P/Ns:
  E0262 DK/DK-C/DK-U
  E0265 PG
  E0267 QG
  E0269 RH
  NSA935130 DE
  NSA935247 PE
  NSA935381 RE
  NSA935387 QE

2. Damage Check Procedure:

A. Single-Core Cables for Panels and Boxes, Low-Temperature 200 deg.C (392.00 deg.F)

(1) Cable layout
(Ref. Fig. 001)

(2) Table for damage assessment
(Ref. Fig. 001)

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REPAIR

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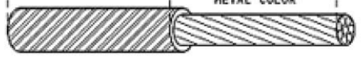
TYPE: BE, BF



**IN SOME CASES, THE INSULATION CAN HAVE A DIFFERENT COLOR

DAMAGE LOCATION	DAMAGE ASSESSMENT	GRADE	REPAIR TYPE (ORDER OF PRIORITY)
INSULATION:	-SURFACE NICKS IN PTFE: YOU CANNOT SEE THE CORE -DEEP NICKS IN PTFE: YOU CAN SEE THE CORE BUT IT IS NOT DAMAGED	4	REPLACE THE CABLE
CORE:	-DAMAGED STRANDS OR CUT CORE: YOU CAN SEE THE COPPER (NICKEL DAMAGED) OR THE STRANDS ARE CUT	4	REPLACE THE CABLE

REPAIR CLASSIFICATION:

GRADE 0:NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1:PERMANENT REPAIR
GRADE 2:A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK (REFER CHAPTER 20-52-10).
GRADE 3:TEMPORARY REPAIR ONLY, REPLACE WITH NEW WIRE IN ACCORDANCE WITH THE BASIC DEFINITION AT SUBSEQUENT C-CHECK.
GRADE 4:NO REPAIR IS PERMITTED (REPLACE THE WIRE).

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Layout and Table for Damage Assessment
BE and BF
Figure 001

REPAIR

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ELECTRICAL STANDARD PRACTICES MANUAL

B. Single-Core or Multi-Core Cables, Unscreened, Low-Temperature 200 deg.C (392.00 deg.F)

(1) Cable layout
(Ref. Fig. 002)

(2) Table for damage assessment
(Ref. Fig. 002)

(3) When the repair type is selected, refer to:

(a) Para. 3 Repair Procedure for the general description and conditions of application.

(b) 20-53-29 GENERAL REPAIR PROCEDURE for more data.

C. Single-Core or Multi-Core Cables, Unscreened, High-Temperature 260 deg.C (500.00 deg.F)

(1) Cable layout
(Ref. Fig. 003)

(2) Table for damage assessment
(Ref. Fig. 003)

(3) When the repair type is selected, refer to:

(a) Para. 3 Repair Procedure for the general description and conditions of application.

(b) 20-53-29 GENERAL REPAIR PROCEDURE for more data.

3. Repair Procedure
(Ref. Fig. 004, 005)

A. Procedure
This paragraph gives the general description and conditions of application for each repair scheme.

B. Allocation Table of Heat-Shrink Repair Sleeves
(Ref. Fig. 006, 007)
The tables that follow give the different types of sleeves that you can use for repair, in relation to the type and gauge of the cable (Refer to Chapter 20-42-12 for SLEEVE SHRINKING PROCEDURE)

NOTE : Make sure you use the correct sleeve for the aircraft temperature zone.

EFF : ALL

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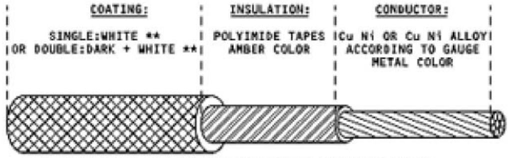
TYPE: AKA, AKB, CF, CF-C, CF-U, PD, PF, QD, QF, RD, RF, AK(150°C/302°F)



**IN SOME CASES, THE COATING CAN HAVE A DIFFERENT COLOR

DAMAGE LOCATION	DAMAGE ASSESSMENT	GRADE	REPAIR TYPE (ORDER OF PRIORITY)
COATING:	-SURFACE SCRATCHES - OUTER COATING: YOU CAN SEE POLYIMIDE INSULATION BUT IT IS NOT DAMAGED -CASE OF CO2 LASER CABLE (CF-C ONLY): YOU CAN SEE THE DARK COATING YOU CAN SEE POLYIMIDE INSULATION THROUGH THE TRANSPARENT COATING BUT THE COATING IS NOT DAMAGED	0	NO REPAIR (CABLE SATISFACTORY IN THIS CONDITION)
INSULATION:	-SURFACE NICKS IN POLYIMIDE: YOU CANNOT SEE THE CORE -DEEP NICKS IN POLYIMIDE: YOU CAN SEE THE CORE BUT IT IS NOT DAMAGED	1 1*	1-B 1-C 1-D 1-E
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE MIDDLE OF CABLE	1*	1-C 1-D 1-E
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE END OF CABLE	1	1-B
CORE:	-DAMAGED STRANDS OR CUT CORE: YOU CAN SEE THE COPPER (NICKEL DAMAGED) OR THE STRANDS ARE CUT	1*	1-C 1-E

SIS 20 53 21 0 ADMO 01

* GRADE 3 FOR SENSITIVE AND EFCS CABLES

REPAIR CLASSIFICATION:

GRADE 0:NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1:PERMANENT REPAIR
GRADE 2:A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK (REFER CHAPTER 20-52-10).
GRADE 3:TEMPORARY REPAIR ONLY, REPLACE WITH NEW WIRE IN ACCORDANCE WITH THE BASIC DEFINITION AT SUBSEQUENT C-CHECK.
GRADE 4:NO REPAIR IS PERMITTED (REPLACE THE WIRE).

Layout and Table for Damage Assessment
AK, CF, PD, PF, QD, QF, RD, and RF
Figure 002

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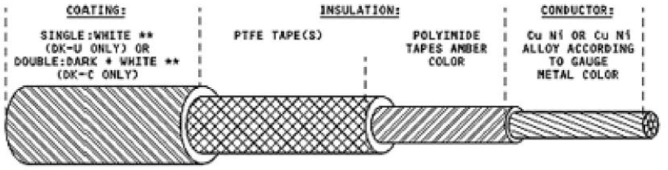
TYPE: DE, DK, DK-C, DK-U, PE, PG, QE, QG, RE, RH



**IN SOME CASES, THE COATING CAN HAVE A DIFFERENT COLOR

DAMAGE LOCATION	DAMAGE ASSESSMENT	GRADE	REPAIR TYPE (ORDER OF PRIORITY)
COATING: (DK-C ONLY)	-SURFACE SCRATCHES IN OUTER COATING: YOU CAN SEE THE DARK COATING BUT IT IS NOT DAMAGED -SURFACE SCRATCHES IN DARK COATING: YOU CANNOT SEE THE PTFE TAPE	0	NO REPAIR (CABLE SATISFACTORY IN THIS CONDITION)
INSULATION:	-SURFACE NICKS IN PTFE: YOU CANNOT SEE THE POLYIMIDE	1	1-A 1-B
	-DEEP NICKS IN PTFE: YOU CAN SEE POLYIMIDE BUT IT IS NOT DAMAGED	1	1-B
	-SURFACE NICKS IN POLYIMIDE: YOU CANNOT SEE THE CORE -DEEP NICKS IN POLYIMIDE: YOU CAN SEE THE CORE BUT IT IS NOT DAMAGED	1*	1-C 1-D 1-E
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE MIDDLE OF CABLE	1*	1-C 1-D 1-E
	-SEPARATION OF AMBER COLORED POLYIMIDE TAPE END OF CABLE:	1	1-B
CORE:	-DAMAGED STRANDS OR CUT CORE: YOU CAN SEE THE COPPER (NICKEL DAMAGED) OR THE STRANDS ARE CUT	1*	1-C 1-E

* GRADE 3 FOR SENSITIVE AND EFCS CABLES

REPAIR CLASSIFICATION:

GRADE 0:NO REPAIR IS NECESSARY (PERMITTED DAMAGE).
GRADE 1:PERMANENT REPAIR
GRADE 2:A CHECK OF THE REPAIR IS NECESSARY AT EACH C-CHECK (REFER CHAPTER 20-52-10).
GRADE 3:TEMPORARY REPAIR ONLY, REPLACE WITH NEW WIRE IN ACCORDANCE WITH THE BASIC DEFINITION AT SUBSEQUENT C-CHECK.
GRADE 4:NO REPAIR IS PERMITTED (REPLACE THE WIRE).

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Layout and Table for Damage Assessment
DE, DK, PE, PG, QE, QG, RE and RH
Figure 003

EFF : ALL

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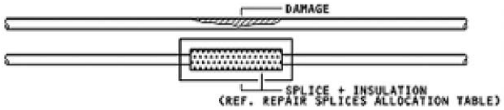
REPAIR TYPE		GENERAL DESCRIPTION	CONDITIONS OF APPLICATION
1	A	-WRAP WITH PTFE TAPE MATERIAL No 05-116	-DAMAGE ≤ 300mm(11.8110in.)
	B	-DISCONNECT THE CABLE TERMINATION -INSTALL THE APPLICABLE HEAT-SHRINK SLEEVE ON THE DAMAGE (REF. SLEEVES ALLOCATION TABLE)	-LENGTH MUST BE EASY TO REMOVE -DAMAGE ≤ 300mm(11.8110in.)
	C	-CUT THE WIRE AT THE DAMAGE -ENGAGE THE APPLICABLE HEAT-SHRINK SLEEVE OR STANDARD SLEEVE ON THE CABLE (REF. REPAIR SPLICES ALLOCATION TABLE) -INSTALL THE APPLICABLE SPLICE ON THE DAMAGE (REF. REPAIR SPLICES ALLOCATION TABLE) -INSTALL THE SLEEVE ON THE SPLICE	-LENGTH OF DAMAGE IS LESS THAN LENGTH OF THE SPLICE -IF THERE ARE MORE THAN 3 REPAIR SPLICES ON THE SAME WIRE, REPLACE THE CABLE



MAKE SURE YOU USE THE CORRECT SLEEVE FOR THE AIRCRAFT TEMPERATURE ZONE.

SIS 20 53 21 0 AJM0 02

R Repair of Standard Cables - Repair Procedure Table
AK, CF, DE, DK, PD, PE, PF, PG, QD, QE, QF, QG, RD, RE, RF and RH
Figure 004

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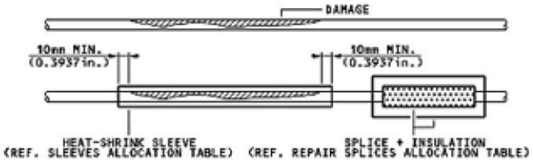
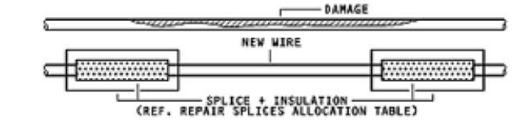
REPAIR TYPE		GENERAL DESCRIPTION	CONDITIONS OF APPLICATION
1	D	-CUT THE WIRE NEAR TO THE DAMAGE -INSTALL THE APPLICABLE HEAT-SHRINK SLEEVE ON THE DAMAGE (REF. SLEEVES ALLOCATION TABLES) TABLE) -ENGAGE THE APPLICABLE HEAT-SHRINK SLEEVE OR STANDARD SLEEVE ON THE CABLE (REF. REPAIR SPLICES ALLOCATION TABLE) -INSTALL THE APPLICABLE SPLICE ON THE CABLE (REF. REPAIR SPLICES ALLOCATION TABLES) -INSTALL THE SLEEVE ON THE SPLICE	-DAMAGE ≤ 300mm(11.8110in.) -IF THERE ARE MORE THAN 3 REPAIR SPLICES ON THE SAME WIRE, REPLACE THE CABLE



MAKE SURE YOU USE THE CORRECT SLEEVE FOR THE AIRCRAFT TEMPERATURE ZONE.

REPAIR TYPE		GENERAL DESCRIPTION	CONDITIONS OF APPLICATION
1	E	-REMOVE AND REPLACE THE DAMAGED SECTION OF THE WIRE -ENGAGE THE APPLICABLE HEAT-SHRINK SLEEVES OR STANDARD SLEEVES ON THE CABLE (REF. REPAIR SPLICES ALLOCATION TABLE) -INSTALL THE APPLICABLE SPLICES ON THE CABLE (REF. REPAIR SPLICES ALLOCATION TABLE) -INSTALL THE SLEEVES ON THE SPLICES	-DAMAGE > 300mm(11.8110in.) -IF THERE ARE MORE THAN 3 REPAIR SPLICES ON THE SAME WIRE, REPLACE THE CABLE



MAKE SURE YOU USE THE CORRECT SLEEVE FOR THE AIRCRAFT TEMPERATURE ZONE.

S15 20 53 21 0 AKM0 00

Repair of Standard cables - Repair Procedure Table
AK, CF, DE, DK, PD, PE, PF, PG, QD, QE, QF, QG, RD, RE, RF and RH.
Figure 005

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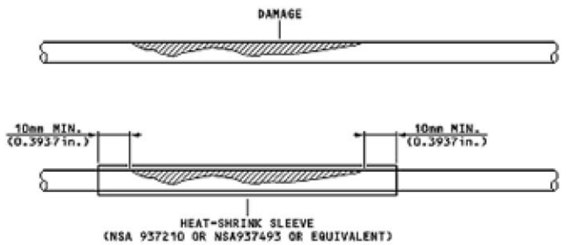
LOW-TEMPERATURE CABLE: TYPE: AK/AKA/AKB, CF, CF-C, CF-U
MULTI-CORE: PD, PF, QD, QF, RD, RF

CABLE GAUGE	SLEEVE NSA937210MB	SLEEVE NSA937493
26	01	001
24	01	001
22	01 OR 02	001
20	01 OR 02	001
18	01 OR 02	001
16	01 OR 02 OR 03	001 OR 002
14	02 OR 03	001 OR 002
12	02 OR 03 OR 04	001 OR 002
10	03 OR 04	001 OR 002 OR 003

NOTE: YOU CAN USE NSA937210MBXX (SEE DETAIL A)
OR NSA937493-XXX (SEE DETAIL A)
OR EQUIVALENT

A



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Repair Sleeves for Low-Temperature Cables - Allocation Table
Method 1B/1D only
Figure 006

EFF : ALL

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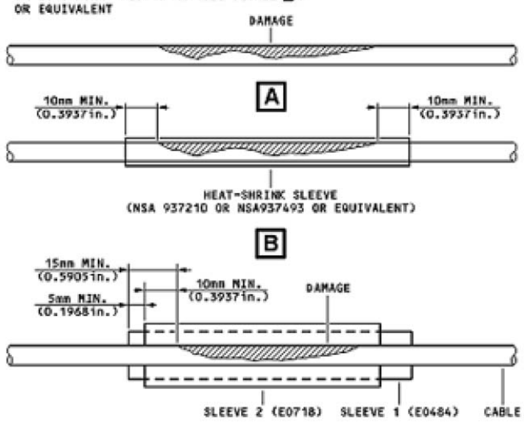
ELECTRICAL STANDARD PRACTICES MANUAL

LOW-TEMPERATURE CABLE: TYPE: DE, DK, DK-C, DK-U
MULTI-CORE: PE, PG, QE, QG, RE, RH

CABLE GAUGE	SLEEVE NSA937210MB	SLEEVE NSA937493	SLEEVES*	
			E0484MJ	E0718
26	01 OR 02	001	/	/
24	01 OR 02	001	/	/
22	01 OR 02	001	/	/
20	01 OR 02	001	/	/
18	01 OR 02 OR 03	001 OR 002	/	/
16	02 OR 03	001 OR 002	01	03 OR 04
14	02 OR 03	001 OR 002	01	03 OR 04
12	02 OR 03 OR 04	001 OR 002	01 OR 02	04
10	03 OR 04	001 OR 002 OR 003	02	04 OR 05
8	03 OR 04 OR 05	002 OR 003	02	05
6	03 OR 04 OR 05 OR 06	002 OR 003 OR 004	02	05 OR 06

* YOU CAN USE NSA937210MBXX OR NSA937493-XXX (SEE DETAIL A)
OR E0484MJXX + E0718-XX (SEE DETAIL B)
OR EQUIVALENT



SIS 20 53 21 0 ASMO 00

B YOU MUST USE 2 SLEEVES: FIRST INSTALL SLEEVE 1 (E0484) ON THE CABLE THEN INSTALL SLEEVE 2 (E0718) ON SLEEVE 1.
MAKE SURE YOU CAN SEE 5mm(0.1968in.)MIN. OF SLEEVE 1 AT THE TWO ENDS OF SLEEVE 2

Repair Sleeves for High-Temperature Cables - Allocation Table
Method 1B/1D only.
Figure 007

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C. Allocation Table of Repair Splices
(Ref. Fig. 008)
The table that follows gives the different types of splices you can use for repair, in relation to the type and gauge of the cable. (Refer to chapter 20-43-1X for SPLICE CRIMPING PROCEDURE).

NOTE : Make sure you use the correct sleeve for the aircraft temperature zone.

NOTE : For more data, refer to 20-53-29 GENERAL REPAIR PROCEDURE.

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E0360RKXXXX
NSA936803RAXXXX

COPPER CABLE				WIRE GAUGE	SPLICE
LOW TEMPERATURE (200°C/392°F)		HIGH TEMPERATURE (260°C/500°F)			
WIRE	CABLE *	WIRE	CABLE *		
AK/AKA/AKB CF/CF-C/CF-U	PD/PF QD/QF RD/RF	DE DK/DK-C/DK-U	PE/PG QE/QG RE/RH	26	RA2324
				24	RA2324 RK2424
				22-20	RA2322 RK2220
				18-16	RA1816 RK1816
				14	RA1314 RK1614
				12	RA1112 RK1210
				10	RA1210 RK1210
				8	RA0808 RK0808
				6	RA0606 RK0606

NSA936809RGXXXX

COPPER CABLE				WIRE SECTION ** (mm²)	WIRE GAUGE	SPLICE	SLEEVE NSA937493
LOW TEMPERATURE (200°C/392°F)		HIGH TEMPERATURE (260°C/500°F)					
WIRE	CABLE *	WIRE	CABLE *				
AK/AKA/AKB CF/CF-C/CF-U	PD/PF QD/QF RD/RF	DE DK/DK-C/DK-U	PE/PG QE/QG RE/RH	0.24 TO 1.3	24-22 20-18	RG0001	001
				1.3 TO 2.6	16-14	RG0002	002
				2.6 TO 6.6	12-10	RG0003	
				6.6 TO 10.5	8	RG0004	003
				10.6 TO 16.7	6	RG0005	004

* THE SPLICE ARE GIVEN ONLY FOR THE REPAIR OF THE WIRE(S) INCLUDED IN THESE CABLES

** THE WIRE SECTION IS THE SUM OF THE CORE SECTIONS OF THE WIRES TO CONNECT.
(e.g.: GAUGE 18 WIRE = 0.93mm2 GAUGE 20 WIRE = 0.6mm2
=> 0.93 + 0.6 = 1.53mm2 => USE RG0002)

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Repair Splices - Allocation Table.
Figure 008

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3. NSA936803

A. P/N Identification

```
   NSA936803   RA2220
       |         |
       |         |                             |  R = Splice Code
       |         |                             |  A = Type
       |         |------------- Reference N°   | 22 = Sequence No.
       |                                       | 20 = Wire Gauge Reference
       |
       ------------------------ Standard P/N
```

B. P/N Characteristics

NOTE : NSA936803 is an assembly which has :

R

- an adapter NSA936810-XX
- a sleeve NSA936811-XX

R - a splice NSA936812-XX

R Two type of barrels can be available but the installation is the

R same.

(1) Temperature
Minimum operating temperature is -55 deg.C (-67.00 deg.F).
Maximum operating temperature is 260 deg.C (500.00 deg.F).

C. Connection Procedure
(Ref. Fig. 002, 003)

(1) Insulation
Do the insulation with the crimp sleeve delivered.
Install this sleeve on the wire before stripping.
Sleeve crimping is made after splice crimping.

(2) Wire stripping
- Use the applicable tool.
- Strip the wire to the length "A" .

(3) Crimping
- Use the applicable crimping tool related to the splice reference number.
- Make sure that the insulation sleeve is installed on the wire .
- If necessary,install the adapters on the wire.

R - For splice RA1212 on a gauge 14 wire only:

R - Put the stripped wire in the ferrule

R - Put the assembly in the splice barrel

R - Tightly hold the wire in the barrel

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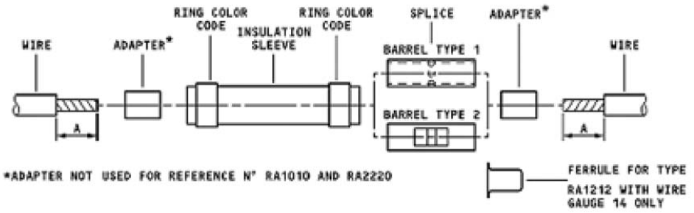
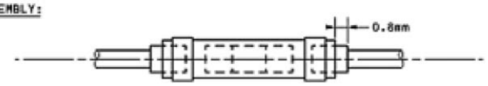
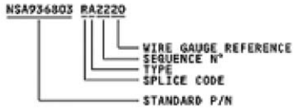


*ADAPTER NOT USED FOR REFERENCE N° RA1010 AND RA2220

COMPLETE ASSEMBLY:





NSA936803RAXXXX

REFERENCE N°	ADMISSIBLE WIRE GAUGE	STRIPPING			
		LENGTH "A" (mm)	TOOL		
			NORM	P/N	COLOR
RA2424	24	4.5			
RA2324	24	4			
RA2322	22-20	5		45-2020-1	BLUE
RA2222	22	5.5			
RA2220	20 TO 16	6			
RA1816	18-16	5.8			
RA1514	16-14	5.8	STRIPMASTER		
RA1314	14	6.8			
RA1212	14-12	7.6		45-1939-1	RED
RA1210	12-10	7.6			
RA1112	12	7.6			
RA1010	10	8			
RA0808	8	10.5	AS	9922801500 OR SCALPEL	-
RA0606	6	12.1	-		

Butt Splices - P/N Characteristics and Stripping Tools
NSA936803
Figure 002

SIS 20 43 11 0 ACMD 06

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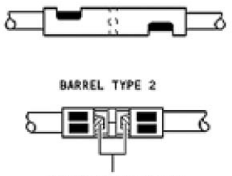
AFTER CRIMPING

BARREL TYPE 1

BARREL TYPE 2



STRIPPED WIRE ENDS

NSA936803RAXXXX

REFERENCE N°	RING COLOR CODE	ADMISSIBLE WIRE GAUGE	CRIMPING TOOL								
			TOOL			HEAD		DIE			
								CONDUCTOR		SLEEVE	
			NORM	P/N	COLOR	NORM	P/N	NORM	P/N	NORM	P/N
RA2424	ALU	24		45730	YELLOW	-	-	-	-	MIL	46467
RA2324	YELLOW	24		45730		-	-	-	-	-	-
RA2322	ALU	22-20		46467	WHITE	-	-	-	-	-	-
RA2222	ALU	22		46467		-	-	-	-	-	-
RA2220	ALU	16 TO 22		46467		-	-	-	-	-	-
RA1816	RED	18-16		46468	RED	-	-	-	-	-	-
RA1514	BLUE	16-14		46469	BLUE	-	-	-	-	-	-
RA1314	BLUE	14		46469		-	-	-	-	-	-
RA1212	YELLOW	14-12	AMP	46470	YELLOW	-	-	-	-	-	-
RA1210	YELLOW	12-10		46470		-	-	-	-	-	-
RA1112	YELLOW	12		46470		-	-	-	-	-	-
RA1010	YELLOW	10		46470		-	-	-	-	-	-
RA0808	RED	8		69064 OR 69120	-	AMP	69099	AMP	69216	AMP	69211-1
RA0606	RED	6		69064 OR 69120		AMP	69099	AMP	69217	AMP	69212-1

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EFF : ALL

Butt Splices - Crimping Tools
NSA936803
Figure 003

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REPAIR

- Put the assembly in the crimping tool die
- Make sure that the splice is in the correct position against the positioner

NOTE : Depending on the barrel type, the position against the positioner is not the same.
- Close the crimping tool
- For other splice references:
  - Put one end of the splice in the crimping tool die.
  - Make sure that the splice is in the correct position against the positioner.

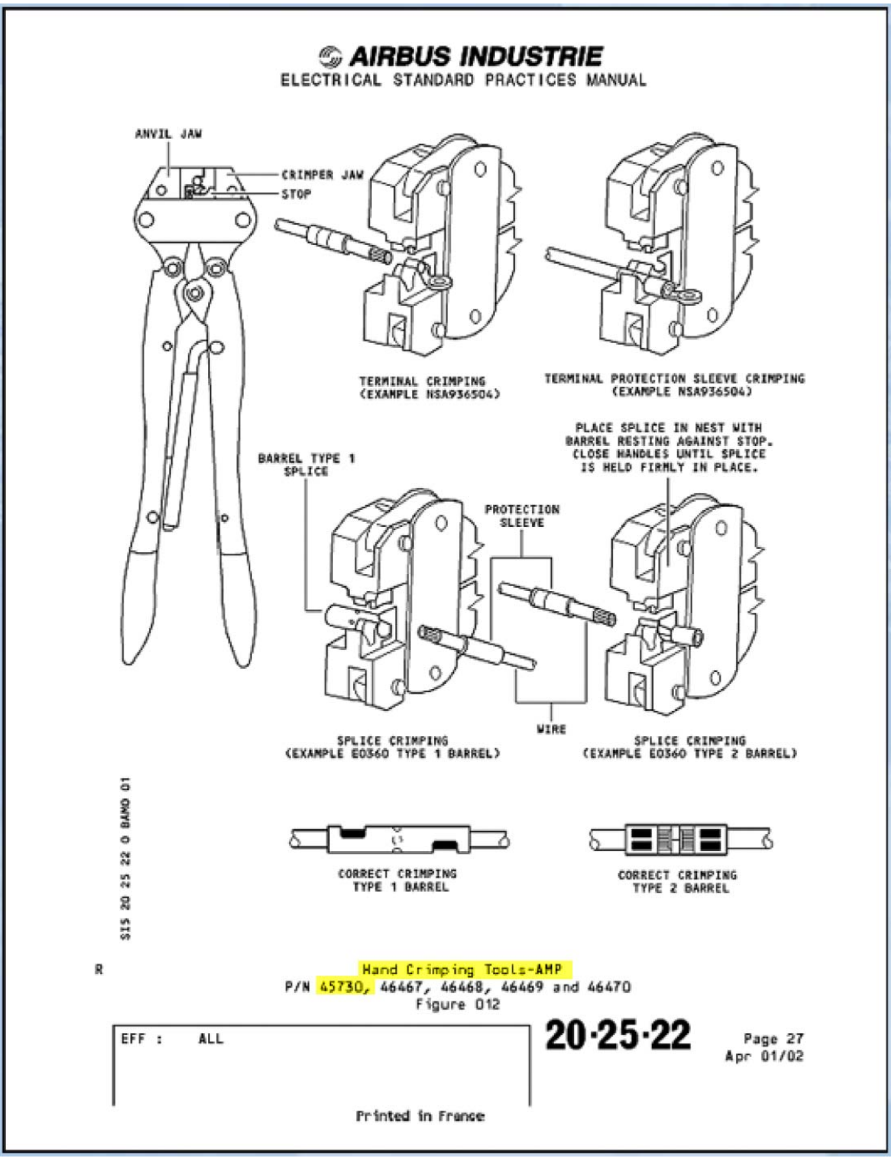
NOTE : Depending on the barrel type, the position against the positioner is not the same.
- Close the crimping tool handles sufficiently to hold the splice in position but do not crimp at this stage.
- Put the stripped end of the wire in the splice barrel.

- Crimp the splice. To do this, fully close the tool handles until the safety ratchet releases.
- Remove the splice from the crimping tool.
- Do the same procedure from step 2 for the other side of the splice.

NOTE : For barrel type 1 only, the second crimping operation must be done diametrically opposite to the first one. For barrel type 2, the two crimping operations must be along the brazing seam centerline and positioned on the same side.
- Do a check to make sure that the splicing is correct.

(4) Insulation sleeve crimping
- Put the insulation sleeve in the correct position.
- Install the sealing adapters under the sleeve. They must show out of the sleeve on a dimension of 0.80 mm (0.0314 in.)
- Put one side of the insulation sleeve in the crimping die.
- Apply a light force to the tool handles handles. Do it carefully so as not to change the position of the assembled items.
- Crimp the sleeve. To do this, fully close the tool handles until the ratchet releases.
- Remove the assembly from the crimping tool.
- Do the same procedure from step 2_ for the other end of the sleeve.
- Do a check to make sure that the sleeves are in the correct condition.

REPAIR



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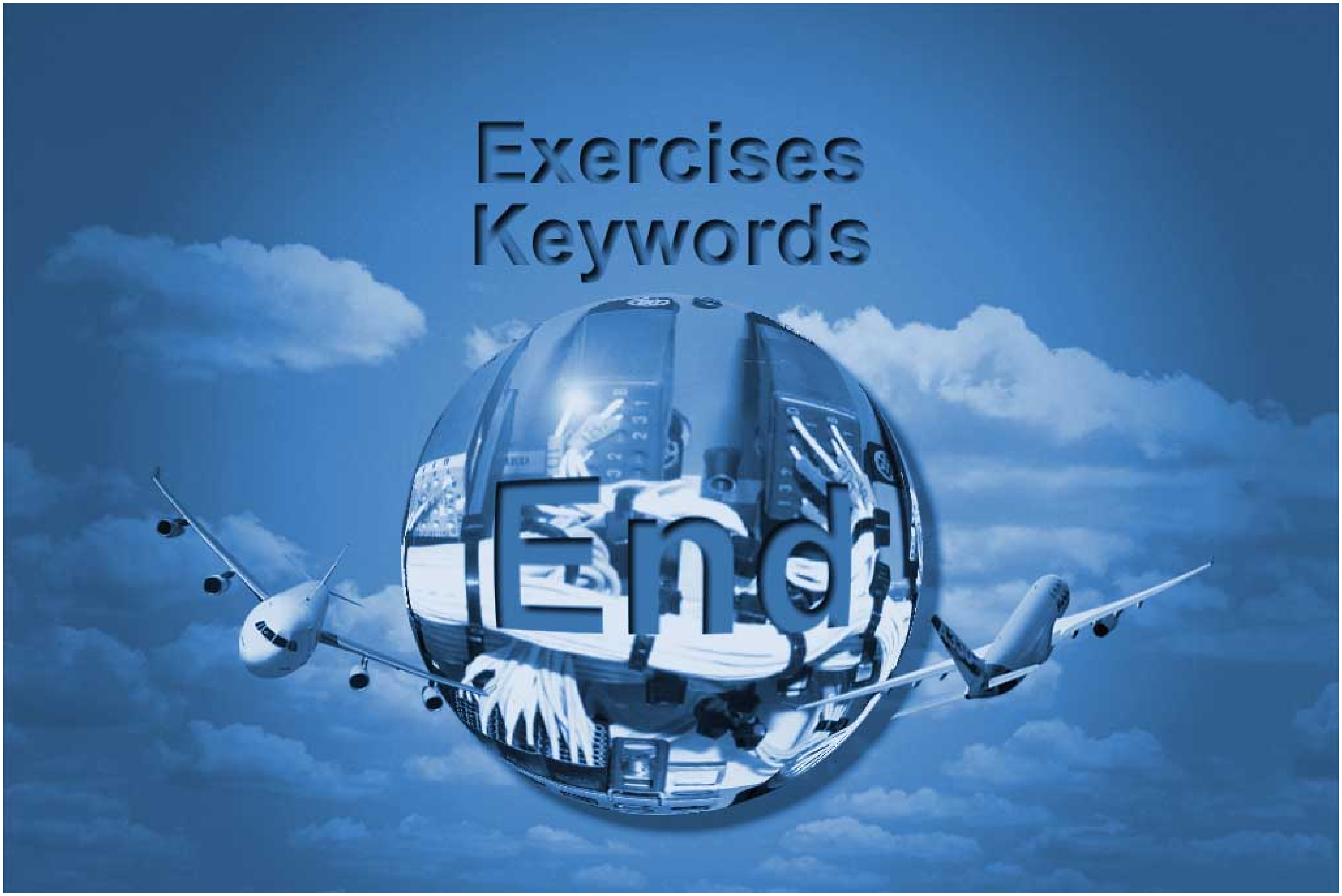

REPAIR

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